NETWORK WORLD
The Newsweekly of Enterprise Network Strategies
Volume 9, Number 29 An International Data Group Publication July 20, 1992

Vendors team in token-ring testing effort

By Bob Brown
Senior Editor

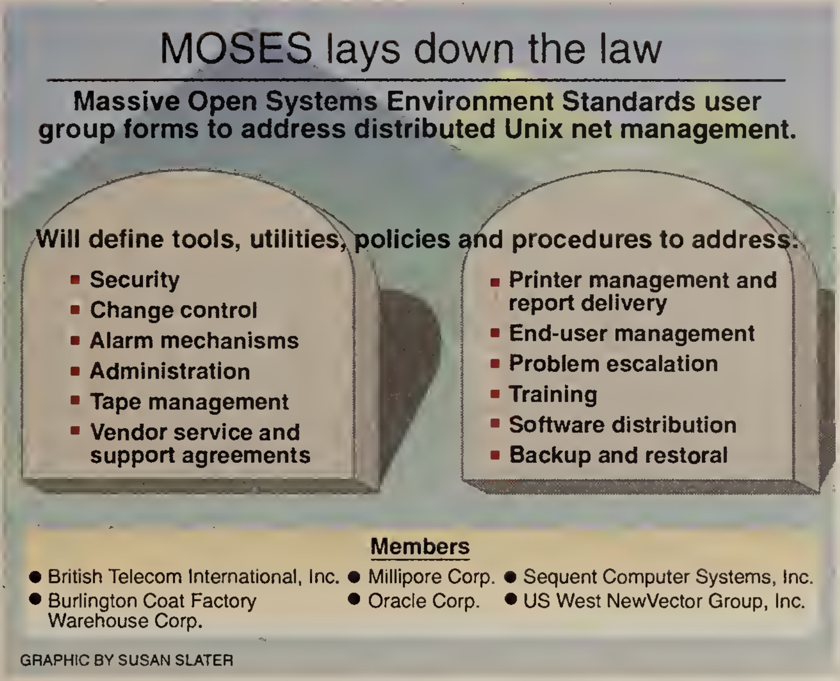
SANTA CLARA, Calif. — IBM, SynOptics Communications, Inc. and other token-ring vendors this week will announce the start-up of an interoperability lab designed to prove that different suppliers' products actually work together.

The Token Ring Interoperability Lab — the first of its kind — is designed as an open test and verification facility for all token-ring equipment vendors. The laboratory will certify products that pass interoperability tests and will release some of its test results to the public.

The lab, which will become operational in September, will focus initially on physical-layer interoperability for 16M bit/sec token rings over unshielded twisted-pair wiring. The University of New Hampshire's (UNH) Interoperability Lab also plans to launch a similar testing program in September, a UNH lab spokesman said.

While no major interoperability problems have yet surfaced in

(continued on page 70)


MOSES lays down the law
Massive Open Systems Environment Standards user group forms to address distributed Unix net management.
Will define tools, utilities, policies and procedures to address:
Security
Change control
Alarm mechanisms
Administration
Tape management
Vendor service and support agreements
Printer management and report delivery
End-user management
Problem escalation
Training
Software distribution
Backup and restoral
Members
British Telecom International, Inc.
Burlington Coat Factory Warehouse Corp.
Millipore Corp.
Oracle Corp.
Sequent Computer Systems, Inc.
US West NewVector Group, Inc.

GRAPHIC BY SUSAN SLATER

Users join forces to tackle distributed systems issues

By Wayne Eckerson
Senior Editor

BELLEVUE, Wash. — A user group calling itself MOSES hopes to lead throngs of IS managers to the promised land of standard operating procedures, tools and utilities for managing distributed processing environments.

MOSES, which stands for Massive Open Systems Environment Standards, includes information systems managers from British Telecom International, Inc., Burlington Coat Factory Warehouse Corp., Millipore Corp., Oracle Corp., Sequent Computer Systems, Inc. and US West NewVector Group, Inc.

The six companies met here last week to begin hashing out solutions to problems they face in trying to manage and administer complex distributed Unix environments. The managers hope their recommendations will help others in the process of migrating to distributed computing platforms and gradually be ac-

(continued on page 6)

FCC paves way for new networking era

Decides to let RBHCs offer video; delivers PCS regulatory framework and spectrum proposal.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — In two ground-breaking decisions last week, the FCC voted to allow RBHCs to partner with program providers to offer new video services and laid out rules governing the emergence of personal communications services (PCS).

Taken together, the decisions "write a bright new chapter in American communications history," said Alfred Sikes, chairman of the Federal Communications Commission. He said the new services will increase competition, encourage network investment and create thousands of new jobs.

Allowing the regional Bell holding companies to carry video programs will give corporations an alternative delivery vehicle for advertising, education and business video traffic and could lead to the launch of new services. PCS, a digital wireless technology, will allow mobile workers to send voice and data from almost any location.

The video ruling, based on FCC proposals made earlier this year, gives carriers greater latitude in working with third parties to develop video services. Until now, telephone companies could

(continued on page 6)

FEATURES

- X.25 switches get face-lifts for the future. Page 46.
- Balancing the public vs. private net equation is a tough task. Page 55.

NETLINE

INTERNET BOARD DELAYS controversial decision on addressing problems. Page 2.

3COM CHARTS three-pronged ATM strategy that spells out future product plans. Page 2.

DEC WRAPS UP OPEN systems tour with "grand opening" of VMS operating system, introduction of OpenVMS servers. Page 4.

AT&T TOLL FRAUD protection service may be more comprehensive and more costly than competing plans. Page 4.

BELL ATLANTIC FILES general tariff for SMDS, could set precedent for other RBHCs. Page 4.

CABLETRON, CODENOLL to roll out FDDI cards for Macs. Page 4.

NEWSPAPER

User test-drives Wellfleet's 1G bit/sec Link Node router

By Maureen Molloy
Senior Writer

WINDSOR, Conn. — Multinational energy supplier Asea Brown Boveri, Inc. (ABB) is completing a beta-test of Wellfleet Communications, Inc.'s next-generation Backbone Link Node and, so far, likes what it sees.

The company is primarily interested in the high availability of the new bridge/router and its fault management capabilities as a way to ensure network resiliency as it migrates mission-critical applications onto its local-area network internet.

"Reliability is my key consideration, and I'm pleased so far with the way the [product] is working," said Rusty Rowell, the network consultant responsible for ABB's North American net. "I've run into some rough edges with the configuration software, but overall, I believe it's capable of supporting a production network."

A limited version of the 1G bit/sec Backbone Link Node will begin shipping this week. The four-slot bridge/router will include all the redundant and fault-tolerant features the company announced last fall, as well as enhanced Simple Network Management Protocol capabilities revealed this spring. But it will initially lack the full protocol and LAN media support originally planned.

(continued on page 71)

SNMP mgmt. on tap for UPS systems

By Bob Brown
Senior Editor

CAMBRIDGE, Mass. — The leading vendors of uninterruptible power supplies (UPS) met here last week to form an Internet Engineering Task Force (IETF) working group to develop a standard that will enable SNMP management systems to control UPSs.

The Simple Network Management Protocol UPS Management Information Base (MIB) will replace proprietary UPS management options and improve the reliability of nets by letting users monitor the lifeblood of critical net components — power.

UPSs outfitted with the new

(continued on page 6)

Microsoft, Apple to forge common database access

Vendors to combine ODBC, DAL to provide users with solution for accessing multivendor databases.

By Timothy O'Brien
West Coast Bureau Chief

SAN JOSE, Calif. — Microsoft Corp. and Apple Computer, Inc. last week announced they will work together to develop a common way for Windows machines and Macintoshes to access multivendor databases.

The companies will blend features of Microsoft's Open Database Connectivity (ODBC) specification with Apple's Data Access Language (DAL) to provide users with a single desktop solution for database access.

"We are all trying to solve the problem of consistent data access and simplify the [application program interface] confusion for developers," said Lowell Tuttman, program manager of ODBC at Microsoft.

The database access partnership was part of a broader announcement between the two companies, which have sparred in the courts over the "look and feel" of the Windows operating system. Microsoft Chairman and Chief Executive Officer Bill Gates and Apple CEO John Sculley agreed on broad plans to work together in a number of areas, including ensuring compatibility

(continued on page 6)

IAB postpones decision on Internet amid opposition

Outcry leaves IP Version 7 in limbo until November.

By Skip MacAskill
and Ellen Messmer
Network World Staff

CAMBRIDGE, Mass. — Facing opposition from the Internet community, the Internet Architecture Board (IAB) last week backed off from a proposal to replace the Internet Protocol with the Connectionless Network Protocol (CLNP) for Internet routing.

In a plan drafted last month, IAB officials proposed Open Systems Interconnection's CLNP, with its rich addressing scheme, as a way to attack the most critical technical problem facing the Internet — the growing shortage of Transmission Control Protocol/Internet Protocol addresses. According to one estimate, Internet users could run out of IP addresses in five years.

The IAB, the standards-setting arm of the Internet, recommended CLNP as a "single focal point for the community" because it appears to form the basis for the best technical solution, said IAB Chairman Lyman Chapin. He said the recommendation was not to be "construed as a blanket condemnation" of other proposals for resolving this problem.

(continued on page 71)

3Com preps to implement three-phase plan for ATM

By Skip MacAskill
Staff Writer

SANTA CLARA, Calif. — 3Com Corp. last week detailed its ATM strategy, which will include products ranging from workstation adapters and hub modules to full-blown ATM switches.

According to Edgar Masri, 3Com's director of business development, the company has devised a three-phase Asynchronous Transfer Mode (ATM) strategy that will be implemented over four years. On tap first are ATM products that address the campus backbone, then the desktop and finally the wide area.

3Com will initially develop an ATM interface for its bridge/router, enabling it to connect to other vendors' local-area network-based ATM switches. This capability will assist users who need better performance than existing Fiber Distributed Data Interface nets can provide.

In order to ensure interoperability with ATM switches, which are expected out later this year from vendors such as Adaptive Corp. and Fore Systems, Inc., 3Com recently joined the ATM Forum, Masri said.

The second phase of the 3Com

(continued on page 70)

Briefs

Industry luminaries head off into sunset. Kenneth Olsen, founder and president of Digital Equipment Corp., and John Young, president and chief executive officer of Hewlett-Packard Co., plan to retire in October. The DEC board of directors is expected to approve Olsen's recommendation that Robert Palmer, vice-president of manufacturing and logistics, be named his successor as president and chief executive officer. Lewis Platt, HP's executive vice-president and head of its Computer Systems Organization, will replace Young Nov. 1.

SNMP to shed a letter? The Simple Management Protocol (SMP), a new specification intended to replace the Simple Network Management Protocol, last week was outlined for the Internet Engineering Task Force (IETF) for the first time at the group's 24th annual meeting. More than 200 IETF members gathered to hear SMP developers discuss the capabilities of the new protocol, including support for more network protocols, communications between network management stations, a bulk data-transfer mechanism and secure SNMP ("Follow-on to SNMP offers wider mgmt.," *NW,* June 22). The IETF said it would seek to put SMP on the standards-making fast track, with the intention of completing review work by March 1993.

Land of the giants. Digital Equipment Corp., Hewlett-Packard Co. and IBM last week announced they have joined forces with Intel Corp., Microsoft Corp., Novell, Inc., SunConnect and SynOptics Communications, Inc. to develop a common application program interface (API) for managing net workstations. The group, which was formed by the latter five firms last May, also last week formally announced its name, the Desktop Management Task Force (DMTF). The DMTF will release a document outlining the API architecture by the end of next month. It expects to demonstrate the architecture's management capabilities at October's INTEROP 92 Fall in San Francisco.

AT&T, GO cooperate on personal communicators. Kicking off the Mobile92 conference in an appropriate spirit, AT&T Microelectronics and GO Corp. last week announced they will team up to offer technologies for pint-size "personal communicators." AT&T said it will help GO customize its PenPoint operating system to work with AT&T's Hobbit, a low-power Reduced Instruction Set Computing processor with integrated communications capabilities. The firms hope to sell the technology combination to manufacturers building mobile computing devices.

French carrier to cut the ties that bind. France Telecom announced it will suspend its existing 2M bit/sec videoconferencing service and instead offer its subscribers PictureTel Corp.'s line of videoconferencing equipment, which uses switched digital dial-up services. France Cable and Radio, the subsidiary operating the videoconferencing service, has ordered 100 PictureTel C-3000 coder/decoders.

Ascom Timeplex, Wang to resell SynOptics gear. SynOptics Communications, Inc., a Santa Clara, Calif., wiring hub vendor, last week announced separate agreements with Ascom Timeplex, Inc. and Wang Laboratories, Inc. under which those firms will resell SynOptics products. Ascom Timeplex, a multiplexer and internetworking equipment vendor in Woodcliff Lakes, N.J., will resell SynOptics hubs and net management software in the U.S. and Canada. Wang, based in Lowell, Mass., will resell SynOptics gear worldwide.

CONTACTS

▲▲▲

We want to hear from you. *Network World* has set up a toll-free number you can use to leave news tips or letters to the editor. Let us know what's going on or how you feel about the stories you read in our publication by calling (800) 622-1108, Ext. 487.

NW Bulletin Board System. Contact us electronically. Our BBS lets you submit letters to the editor, pass on tips, leave change of address requests, interact with other readers, download free software and hunt for jobs. You can use your IBM, Apple or other microcomputer to reach the BBS at 300 to 2,400 bit/sec (8N1) by dialing (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178.

CONTENTS

Data Net Architectures 9
Fiber net saves video firms time, money.
Rabbit SNA gateway offers third-party client support.

Local Networking 15
Origen eases pain of NetWare upgrades.
DG stresses reliability with two new AViiON servers.

Internetworks 21
ATM emerging as LAN hub alternative.
New module lowers cost of Fibermux LAN hub ports.

Global Services 23
FTS 2000 contract charges under fire.
Lynx puts global info at net managers' fingertips.

Enterprise Applications 25
Mgmt. concerns slow distributed systems.
UniSQL integrates object and relational technologies.

Industry Update 31
Client/server move may alter industry.
'Politics as usual' stalling House Antitrust Reform Act.

Management Strategies 33
Self-study vital to pick the best net mgmt. system.

Opinions 42

Features 46

Action Center 58

Networking Marketplace 64

Networking Careers 69

REPRINTS

Article and chart reprints (minimum 500 copies) can be ordered from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172; (508) 875-6400.

Back issues ($5 per issue) can be ordered from Bobbie Cruise by calling (800) 622-1108.

To frame relay users tired of being stuck in traffic, Sprint offers the fast lane.

We know. They told you frame relay could zap huge amounts of data from LAN to LAN with lightning speed. But eventually, you found out they could only send your data in dribs and drabs.

Well, take heart. Sprint's Frame Relay service is unlike the others. Because ours doesn't limit the flow of data into the network. Instead, it gives you the capability to send longer bursts of data. Net result: Less delay and greater throughput. Net net result: You spend less time sending and receiving data, and more time using it.

To us, it seemed like a better way. That's why we designed our Frame Relay network specifically around your needs. Ultimately, though, it's up to you: Bumper-to-bumper data. Or the fast lane. **1-800-736-1130**.

Sprint®

Not just another phone company.℠

© 1992 Sprint Communications Company L.P.

DEC opens up VMS, pads server, net software suite

Vendor's OpenVMS POSIX 1.1 makes U.S. debut.

By Jim Duffy
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. last week wrapped up its two-week open systems tour with a splashy "grand opening" of its proprietary VMS operating system at company headquarters here.

At the same time, DEC unleashed servers it claims are unmatched by competitors' offerings in price/performance, enhanced its database access server software and updated its Transmission Control Protocol/Internet Protocol software for VMS ("DEC announces expansion to open system offerings," *NW,* July 13).

Following announcements in Zurich, Switzerland, and Tokyo, DEC made its U.S. introduction of OpenVMS POSIX Version 1.1. Boasting the only non-Unix operating system in the U.S. to receive the X/Open Company, Ltd.'s seal of portability, DEC officials said users will now be able to port Unix applications as easily to OpenVMS as they do to other Unix platforms.

DEC users said the X/Open brand ensures that they will be able to develop OpenVMS applications that foster tighter interoperability between disparate systems.

"It will allow us to build applications that we can share across platforms," said Jim White, a net consultant at E.I. du Pont de Nemours & Co. in Wilmington, Del. "Without it, there's very little opportunity for interoperability."

DEC also unveiled a suite of OpenVMS servers it said establish new industry benchmarks in price/performance.

The servers range from desktop models, such as the MicroVAX 3100 Model 90, to data center information hubs, such as the VAX 7000 symmetric multiprocessor. Price/performance ratios range from 34 transactions per second and $8,177 per transaction for the MicroVAX 3100 Model 90 to 123 transactions per second and $8,938 per transaction for the VAX 7000.

The VAX 7000 can also be upgraded to DEC's next-generation Alpha processor by swapping out a board. But Richard Copeland, project leader of information technology at Corning, Inc. in Corning, N.Y., said that aside from the easy Alpha upgrade, the VAX 7000 is nothing more than a "repackaged" VAX 6000.

Copeland said he is, however, interested in evaluating DEC's Accessworks database server software, which now supports SQL Access Group services for multivendor database access. Accessworks allows users of MS-DOS, OS/2, Apple Computer, Inc. Macintosh, Sun Microsystems, Inc. SunOS, and DEC VMS and Ultrix clients on Pathworks net-

(continued on page 70)

Cabletron, Codenoll prep FDDI cards for Macintosh

By Skip MacAskill
Staff Writer

SAN FRANCISCO — Cabletron Systems, Inc. and Codenoll Technology Corp. last week laid out plans for providing FDDI interface cards for Apple Computer, Inc. Macintoshes.

Adapters from both companies will work with Apple's Macintosh II and Quadra computers, be powered by Motorola, Inc.'s 68020 processor and support FDDI's Station Management (SMT) protocol.

Codenoll will officially announce its CodeNet adapter card line, which includes the 9550, 9553 and 9750 cards, early next month ("Codenoll to unveil FDDI for the Mac," *NW,* June 15).

The products are NuBus-compatible 100M bit/sec Fiber Distributed Data Interface cards that work with Apple's A/UX, AppleShare for Macintosh and other FDDITalk-compatible operating systems. FDDITalk software is included with each card.

The 9550 is a Single Attached Station adapter that is connected via a multimode fiber link to a port on Codenoll's 9041 Modular Concentrator or any other standard FDDI concentrator at distances up to 2 km. It will be available in 30 days for $3,995.

> The FDDI cards will aid Macintosh users working with bandwidth-intensive applications.
>
> ▲▲▲

The 9553 is a Dual Attached Station adapter that connects directly to a dual-FDDI ring. In the event of a net failure, the 9553 will automatically switch traffic to the redundant ring. It will also ship in 30 days and costs $4,995.

The 9750 supports shielded twisted-pair wiring, otherwise known as SDDI. It supports lengths of up to 100 meters and is expected to ship by early September. It is priced at $3,495.

"The timing of [Codenoll's] announcement is good because high-speed networking will be making an impact on the Mac very soon," said Chip Pettirossi, a research analyst at International Data Group in Framingham, Mass. "The Mac's desktop publishing, graphics and scanned image capabilities are a nice fit with FDDI's speed."

Cabletron's F6069 Desktop Network Interface (DNI) adapter card, introduced at the Mactivity '92 trade show here, supports Apple's A/UX 3.X and System 6 and 7 operating systems. It includes a Motorola FDDI chipset and support for SMT Version 6.2, which provides interoperability with other vendors' FDDI products.

The adapter card can be managed via any Simple Network Management Protocol net management system and comes equipped with the company's LANView Diagnostic System, which provides line status information via LEDs.

The F6069 DNI adapter card is expected to ship by mid-October and will cost $2,995.

A card that supports shielded and unshielded twisted-pair wiring will be available after the ANSI standard for transmitting FDDI over copper is approved.

Analysts said the FDDI cards will aid Macintosh users working with bandwidth-intensive applications, including imaging, computer-aided design and manufacturing and digital video.

"People on high-end Mac IIs and Quadras are pushing the envelope in terms of applications," said Bob Lapointe, manager of desktop networking solutions for Cabletron. "People have been asking for a high-speed pipe out of the Macs." ☐

Correction: Due to an editing error, the story "Hermes to deliver Windows mgmt. tools" *(NW,* July 13) incorrectly identified the vendor of Microsoft Corp.'s LAN Manager for Windows NT. We regret the error.

Bell Atlantic leads the way; first to file tariff for SMDS

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — Bell Atlantic Corp., an ardent supporter of Switched Multimegabit Data Service (SMDS), last week filed a general tariff for the service in Pennsylvania.

Although many regional Bell holding companies have announced support for SMDS, Bell Atlantic is the first to file a general tariff, which analysts say will serve as a model for other telephone companies.

"We think our pricing will make very high speed data service available to a broad audience, including companies that previously could not afford a service with this kind of bandwidth," said Paul Froyd, director of fast packet product development for Bell Atlantic. Froyd is also president of the SMDS Interest Group, an association of users, local and long-haul carriers, equipment vendors and consultants formed in 1991 to promote SMDS.

SMDS is a switched high-speed digital data service capable of supporting transmission speeds between 1.5M bit/sec and 155M bit/sec. The service promises to be more flexible and cost-effective than dedicated links for certain applications, such as local-area network interconnection.

Bell Atlantic's filing of the tar-

(continued on page 70)

AT&T sheds light on toll fraud plan

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T finally disclosed details of the toll fraud monitoring and liability protection service it announced in May, revealing that its offering will be somewhat more comprehensive but more expensive than those of its rivals.

Compared to a similar toll fraud program offered by Sprint Corp., AT&T's service could be almost three times as expensive for users with large numbers of private branch exchanges, key systems and voice mail systems to protect. However, AT&T's offering covers 800 service and provides an enhanced version of its service that protects customers from any liability for toll fraud losses; Sprint offers neither.

Users have pressed the Federal Communications Commission, Congress and carriers for help in bringing toll fraud under control. Toll fraud, in which hackers steal passwords or authorization codes and dial into PBXs to place unauthorized long-distance calls, has reached almost epidemic proportions, costing users between $1 billion and $4 billion annually.

Both AT&T and Sprint offer similar monitoring, notification and reporting features through their services, dubbed AT&T Netprotect and SprintGuard, respectively, and both require users to employ security measures.

AT&T provides two levels of liability protection with its offering: a regular version that caps user losses at $25,000 per device per incident and Netprotect Premium, which shields users from all toll fraud losses. However, at both levels, users that do not bring the toll fraud under control within two hours are subject to losses beyond that time.

Sprint caps user losses at $25,000 per device per year and any losses on a device that exceed $1 million. Most toll fraud losses

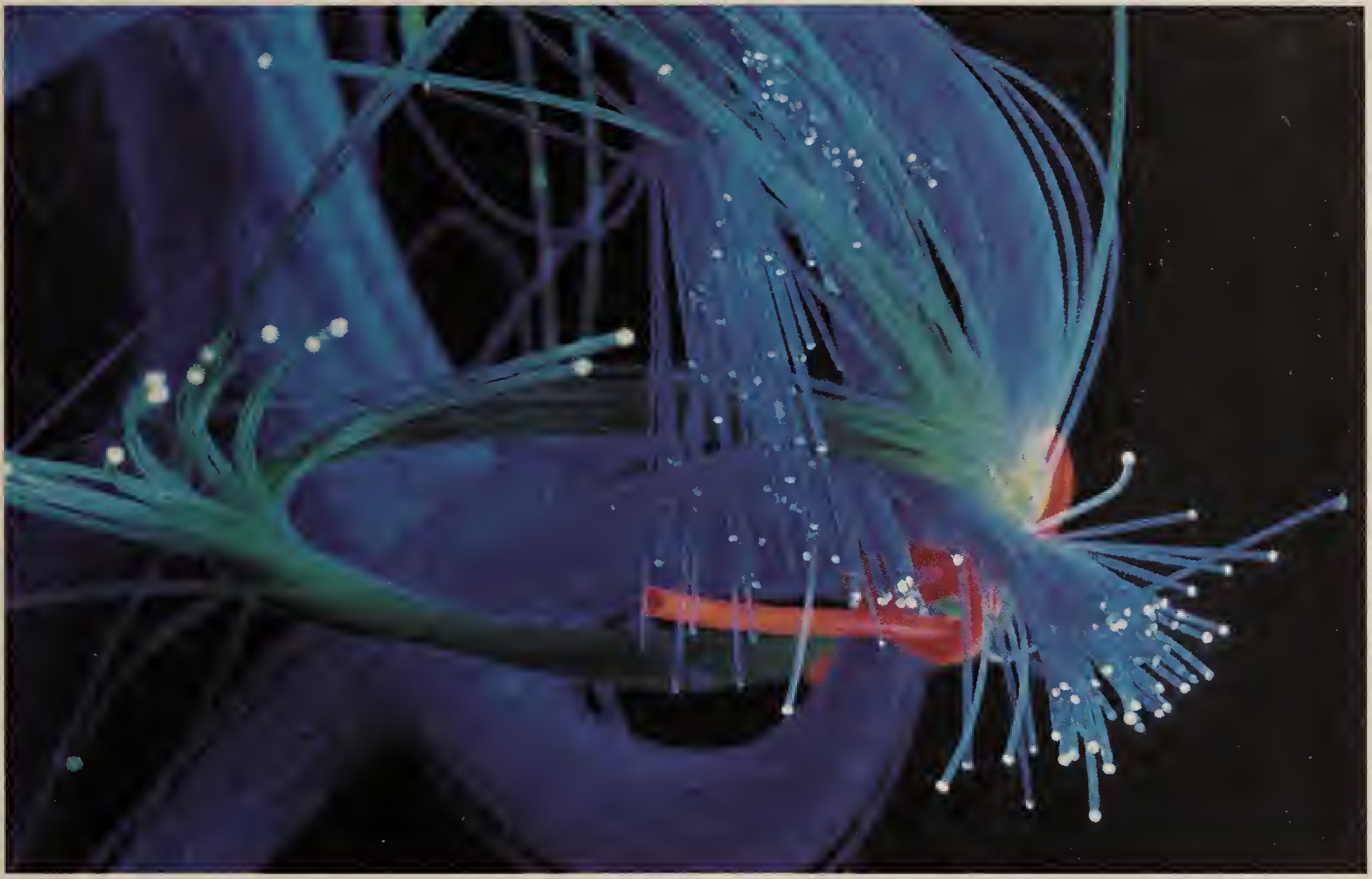
(continued on page 71)

Get in touch with the R.A.F.

The Reader Advocacy Force (R.A.F.) tackles the tough issues facing our readers — the buyers of network products and services. As consumer advocates, we want to hear about any problems you've encountered with products, service and support, or interoperability of equipment, as well as any other concerns you have.

We'll investigate your tip and, if we write about it, we'll send you a T-shirt emblazoned with the *Network World* R.A.F. logo.

You can contact us via the R.A.F. hot line at (800) 622-1108, Ext. 487 or through the R.A.F. Forum on our electronic Bulletin Board System (BBS). For instructions on using the BBS, see page 2.

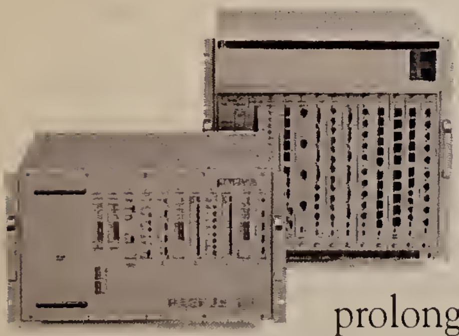


Your Fiber Network is the Backbone of Our Business

For companies large and small, fiber optics is a powerful tool that can be used to make enterprise networks more efficient. To realize the maximum benefits of fiber however, you need to work with a company that has a track record of delivering high-performance fiber networking solutions. That's why if you use, or plan to use fiber anywhere in your enterprise network you need to talk to Fibermux.

Our Magnum100™ is the industry's leading fiber backbone. We have installed over 10,000 nodes, most of those in the complex network environments of *Fortune* 1,000 companies. And we've been providing FDDI solutions since the standard's inception.

Industry leaders continue to rely on Fibermux solutions because we pioneered the cost-effective utilization of fiber, and we have the products to make fiber work in the most demanding applications where multiple computing resources need to be transparently combined.



With Magnum100 and our Crossbow™ multi-LAN intelligent hub, we have the tools you need to connect and manage all your networks. Fibermux fiber solutions provide the structure that will prolong the life of your cable plant, increase network productivity and allow you to use your existing equipment while accommodating network growth.

Fiber networks are the backbone of our business. Call (800) 800-4624 and let us prove it.

Fiber Backbones • Multi-LAN Hubs • Structured Network Solutions

ADC Fibermux

©1992 Fibermux Corporation • 9310 Topanga Canyon Blvd. Chatsworth, CA 91311 • (818) 709-6000 • FAX (818) 709-1556
Fibermux, Magnum100 and Crossbow are trademarks of Fibermux Corporation.

Circle Reader Service #106

Users join to tackle issues

continued from page 1

cepted as standard practices.

"One of the major impediments to the widespread dissemination of large open systems processing environments is the lack of a cohesive glasshouse management methodology," said Michael Prince, director of IS at Burlington Coat Factory in Lebanon, N.H. "We all found ourselves inventing the wheel for things that are standard operating procedure in a mainframe shop."

MOSES members decided to band together and jointly establish methods and procedures for managing distributed Unix platforms they would adhere to and disseminate to the rest of the industry for input and consideration.

"We basically want to see if we can create a glasshouse tradition for running large [Unix] systems," Prince said.

The group first met in April in Denver, where it defined 12 critical management issues to address: security, change control, alarm mechanisms, user administration, tape management, service-level support agreements with vendors, printer management and report delivery, end-user management, escalation procedures, staff training, software distribution, and backup and restoral procedures.

The group hopes to recommend standard tools and utilities for addressing some of these issues. MOSES members don't intend to develop these tools, but they will if necessary. They hope they can find adequate tools developed by vendors or other users, Prince said.

Each member was asked to write a white paper, outlining proposed management methods and tools, on one of the 12 issues. The group is meeting this week to review the first drafts of those white papers. Final drafts are due Aug. 15, Prince said.

The group plans to formally introduce itself at the Unix Expo conference Sept. 22-24 in New York and make the completed white papers available for review at that time.

After that, the group may either disband or expand its membership to include all parties who want to continue a dialogue on these issues or further refine them, Prince said.

There is a strong consensus among the group members about the issues to address and ways to approach them, even though the companies represented are in diverse industries, including retail, pharmaceuticals, telecommunications and software.

"As disparate as our companies are, it's amazing how similar our problems are and the ideas we have about how to solve them," Prince said.

Currently, all MOSES members are users of Oracle databases and Sequent processors. But he said there was no intention to exclude users of other databases and hardware platforms. The group's only intention was to remain small initially so it could more easily and rapidly establish standards.

Microsoft, Apple to forge access

continued from page 2

between applications and future operating systems.

According to Microsoft's Tuttman, the combination of ODBC and DAL technologies will make it easier to develop and deploy client/server applications that work with various databases. Only one API will be needed for either Windows or Macintosh applications.

"These are the kinds of moves the industry applauds," said Tom Wood, senior industry analyst with the Business Research Group, a consulting firm in Newton, Mass. "These companies are finally paying attention to what users want, which is not to wait for a single standard but to simply make existing products work together."

DAL, which is client/server SQL software that is integral to Apple's Virtually Integrated Technical Architecture Lifecycle enterprise integration framework, provides desktop applications on both Macintosh and Windows with access to 12 relational databases today.

ODBC, which is based on SQL Access Group Call Level Interface (CLI) specifications, is a Windows-based interface that will provide access to virtually all leading database platforms. The ODBC API embodies 22 SQL Access Group CLI core functions as well as an additional 29 functions added by Microsoft.

To accomplish this level of data access, the Apple equivalent of ODBC's Driver Manager, the Macintosh Data Access Manager, will be extended to support ODBC functions. At the same time, Apple plans to build a Macintosh ODBC/DAL client that will provide ODBC applications with access to machines supporting DAL servers.

In addition, Apple intends to develop, and Microsoft intends to distribute and support, an ODBC/DAL client for the Windows operating system. Apple plans to implement support for ODBC by the first half of next year.

FCC paves way for new net era

continued from page 1

own and operate cable or video operations only outside their local service area.

Under the new rules, telephone companies can provide video transmission services within their territories only if the programs are developed by an outside firm.

However, RBHCs can purchase as much as 5% of a programmer, form joint ventures with programmers and loan money to such enterprises. The only limit on these arrangements is that the RBHCs will not be allowed to take a controlling interest in programming firms.

In addition, the FCC opened the door for the RBHCs to provide a host of support services for video programming, including video gateways, video processing, billing and collection, order processing and consulting. Local carriers will also be allowed to provide video customer premises equipment and perform the home wiring needed to carry programs.

FCC officials hope that by allowing the RBHCs to partner with programmers and offer related services, they will have an incentive to invest heavily in the technology needed to support wideband applications. The companies can carry video transmissions today, but such applications are generally point-to-point and are not widely available.

While it was a monumental decision for the FCC, RBHC reaction was mixed.

Allowing "full programming would provide incentives for the telephone companies to accelerate the deployment of broadband technologies," Nynex Corp. reported. "Without the right to offer programming services, the public telephone network is unlikely to supply meaningful competition to today's cable television monopolies."

Bell Atlantic Corp. was more upbeat about the decision, saying it would press for the ability to offer programming but will continue to invest in its the network during the interim. Bell Atlantic will spend $500 million this year to add 250,000 miles of fiber-optic cable to its network, saying that is more than all CATV operators have combined.

The FCC decision puts the RBHCs just one step away from being able to do actual programming, which critics such as FCC Commissioner James Quello said could be a disaster. He said an RBHC programming provision could spell the end to free television service in the country.

Others worry that new fiber-optic facilities and other technologies needed to deliver high-bandwidth video services may drive up the cost of all local telephone service.

PCS rollout

In another major decision last week, the FCC laid out a new deployment plan for PCS. The FCC proposed carving out three frequency bands for the service, including a band set aside for data transmissions.

The FCC recommended that the bulk of PCS should go in the 2-GHz range, but the actual allocation of the spectrum is being handled in a separate proceeding. If that spectrum is made available, the FCC proposed setting up at least three PCS providers per metropolitan market area and giving them each between 20 MHz and 40 MHz of bandwidth.

As part of the allocation proposal, the FCC suggested setting aside frequency bands from 1910 MHz to 1930 MHz for nonlicensed, computer-oriented PCS. Such services could include wireless private branch exchanges, local-area networks and computer-to-computer links. Service providers would have to obtain FCC approval for their equipment but would not have to apply for a license to run the service.

Additionally, the FCC set aside three 1-MHz allocations in the lower 900-MHz frequency for narrowband PCS such as paging.

SNMP mgmt. on tap for UPS

continued from page 1

MIB will be able to, in the event of a power failure, keep network devices up while forwarding an alarm to a central SNMP net management station. The SNMP MIB will also enable net managers to proactively manage their nets by programming UPS devices to turn on separately powered backup network devices in the case of electrical problems.

"We're doing something that will get network managers looking at UPS in a whole new way," said Adam Stolinski, director of product management at Emerson Computer Power, an Irvine, Calif., UPS device vendor.

Steve Chau, a staff analyst at Charles Schwab & Co., Inc., a brokerage firm based in San Francisco, applauded the effort.

"It's becoming important to be able to manage UPS devices because the data on the [networks] they're supporting is so critical," he said.

Vendors representing about 75% of microcomputer UPS sales — including American Power Conversion Corp., Best Power Technology, Inc. and Emerson Computer Power — attended the IETF meeting.

The UPS group, which reviewed a draft MIB document submitted by Emerson Computer Power and Jeff Case, president of SNMP Research, Inc. and an originator of SNMP, hopes to submit a standard proposal to the IETF in November. It will take at least 10 months for the proposal to become a full standard, Stolinski said.

While the IETF meeting was productive, there are still issues that need to be sorted out, Stolinski said. Among them is whether to build a single UPS MIB or two UPS MIBs, one for the installed base and an advanced MIB for the newer, smarter UPS systems.

Either way, the standard promises to be a boon for net users, Stolinski said. "Right now, sitting at a monitor tied to a UPS device is like watching paint dry — most companies just don't take that many power hits unless they're someplace like Florida," Stolinski said. "But with SNMP, you'd be adding management functionality that would give the UPS devices a lot more to do."

Chau, who is designing a new Fiber Distributed Data Interface-based backbone net for Charles Schwab, said "UPS with SNMP will actually let you centrally manage your network and conduct clean shutdowns."

If, for example, a router on an FDDI net was about to go down because of a power shortage, the UPS would kick in and keep the router running on battery power and send an alarm to a central SNMP-based management system to notify it of the problem, Chau said. The central management system, in turn, could alert users about the failure, force servers to back up files and reroute traffic to a backup router if one was on standby, he added.

Stolinski described one Emerson Computer Power customer, a financial institution he declined to name, that may be interested in managing UPS devices via SNMP. The company currently polls personal computers at its various branches each evening after the offices close but is concerned about the security implications of leaving the computers on all night.

Using the new SNMP MIB, the company could configure its UPS devices so they could turn the PCs off after they have been polled, he said.

Those interested in working on the UPS MIB can contact Mike Davison of SNMP Research at (615) 573-1434 or on the Internet at davison CD.UTK.EDU.

INTRODUCING EMBARC℠ BY MOTOROLA. NATIONWIDE, WIRELESS COMMUNICATION LIGHT YEARS AHEAD OF ITS TIME.

EMBARC ADVANCED MESSAGING SERVICES— THE PORTABLE RESOURCE TO STAY ONE STEP AHEAD.

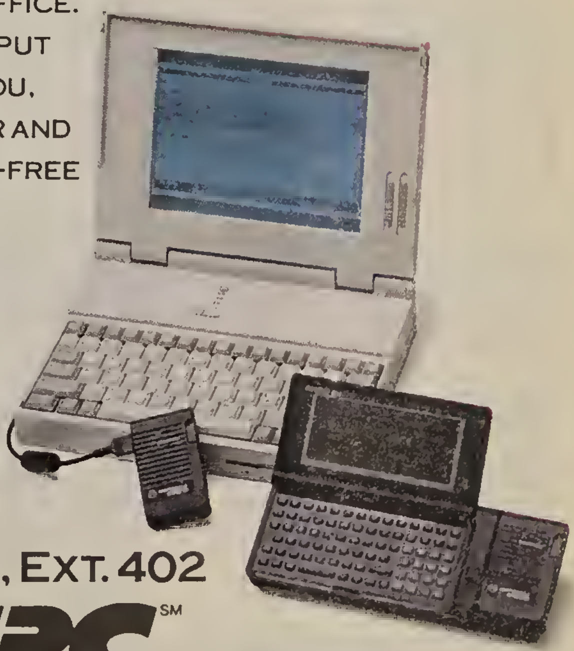
IMAGINE A WORLD OF SEAMLESS COMMUNICATIONS. WHERE THE INFORMATION YOU DEPEND ON IS AUTOMATICALLY SENT TO YOUR PORTABLE COMPUTER—EVEN IF YOU'RE ACROSS THE COUNTRY.

WITH EMBARC ADVANCED MESSAGING BY MOTOROLA, IT'S MORE THAN A DAYDREAM. ELECTRONIC MAIL, INFORMATION SERVICES SUCH AS USA TODAY NEWS AND WEATHER BRIEFS, AND CUSTOMIZED APPLICATIONS CAN BE SENT TO ONE PERSON OR TO THOUSANDS IN A SINGLE TRANSMISSION. CONVENIENTLY *AND* COST-EFFECTIVELY THROUGH PERSONAL WIRELESS RECEIVERS.

IT'S WHERE PORTABLE COMMUNICATIONS ARE HEADED IN THE FUTURE, YET THE ADVANTAGES ARE IMMEDIATELY CLEAR. TO HELP YOU ENHANCE PERSONAL PRODUCTIVITY, REDUCE COMMUNICATION COSTS AND KEEP PEOPLE A STEP AHEAD OF THE COMPETITION—EVEN WHEN THEY'RE AWAY FROM THE OFFICE.

TO FIND OUT HOW TO PUT EMBARC TO WORK FOR YOU, YOUR PORTABLE COMPUTER AND YOUR COMPANY, CALL TOLL-FREE FOR INFORMATION.

YOU'LL LEARN HOW A TECHNOLOGY LIGHT YEARS AHEAD OF ITS TIME CAN HELP YOU MEET THE BUSINESS CHALLENGES YOU FACE EVERY DAY.



1-800-EMBARC4, EXT. 402

EMBARC℠

ADVANCED MESSAGING BY MOTOROLA

Motorola and NewsStream are trademarks of Motorola, Inc.
EMBARC is a servicemark of Motorola, Inc. © Motorola, Inc. 1992

THE PAINLESS PILGRIMAGE FROM ANALOG TO DIGITAL

Model	Type	Max. Rate	Network	Features
SW56II	Accunet Sw. Digital	56 Kbps	4-wire Sw. Digital	Keypad, Autodialer
DU100	Datapath Sw. Digital	64 Kbps	2-wire Sw. Digital	All Rates
DU170	Datapath Sw. Digital	64 Kbps	2-wire Sw. Digital	Keypad, Autodialer
TA120	Terminal Adapter	2 Ch. @ 64K 1 Ch. @ 16K	ISDN	Supports Voice & Data
TA/DL	Terminal Adapter	1 Ch. @ 64K 1 Ch. @ 16K	ISDN	X.25 PAD, Soft Upgrade
TA220	Terminal Adapter	2 Ch. @ 64K 1 Ch. @ 16K	ISDN	Combines "B" Channels
D56	DSU/CSU	56 Kbps	DDS	Low Cost 56K Sync.
DDS/MR1	DSU/CSU	56 Kbps	DDS	All DDS Rates
DDS/MR2	DSU/CSU	56 Kbps	DDS	DDS with Sec. Channel
DDS/V.32	DSU with V.32 Modem	56 Kbps	DDS/ Analog	Auto-dial Backup
T1-ESF-CSU	CSU	1.544 Mbps	T1	ESF & D4 Framing

Sooner or later, you've got to make the move from analog to digital for your data communications. And contemplating the trip is a little spooky.

Here's the way to make the pilgrimage both painless and profitable.

Just stick with UDS.

Years of industry leadership in high-speed modems have taught UDS the ins and outs of the telephone system—both leased line and dial-up. That knowledge has now been transferred to the developing world of the digital telephone network. At UDS, more than a dozen digital devices—DSU/CSUs, (DDS, T1, fractional T1, T1-ESF) switched 56 and ISDN terminal adapters and termination devices—are already being shipped. They are appropriate for a wide variety of applications—present and future.

Every pilgrimage is easier with a reliable guide, so save yourself the stress, the false starts, the unnecessary expense. As you go digital, look to UDS for applications expertise, reliable products and competitive pricing. Call:

800-451-2369

UDS

MOTOROLA

Quality Means The World To Us.™

Circle Reader Service #110

Free Information for Readers of NETWORK WORLD

NETWORK WORLD

LEAD SERVICE

Issue date July 20, 1992

Card must be received by November 15, 1992

Name
Title
Company
Street
City
State Zip
Phone Fax

☐ ***URGENT***

1. Action requested
- 1 ☐ Request for sales call
- 2 ☐ Request for proposal
- 3 ☐ Request for information

2. Purchase timeframe
- 4 ☐ Within 60 days
- 5 ☐ Within six months
- 6 ☐ Within one year

3. Scope of purchase responsibility
- 7 ☐ Enterprise wide
- 8 ☐ Departmental

4. Purchase influence/number of sites
- 9 ☐ One site
- 10 ☐ 2-9 sites
- 11 ☐ 10-20 sites
- 12 ☐ 21+ sites

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175

NETWORK WORLD

LEAD SERVICE

Issue date July 20, 1992

Card must be received by November 15, 1992

Name
Title
Company
Street
City
State Zip
Phone Fax

☐ ***URGENT***

1. Action requested
- 1 ☐ Request for sales call
- 2 ☐ Request for proposal
- 3 ☐ Request for information

2. Purchase timeframe
- 4 ☐ Within 60 days
- 5 ☐ Within six months
- 6 ☐ Within one year

3. Scope of purchase responsibility
- 7 ☐ Enterprise wide
- 8 ☐ Departmental

4. Purchase influence/number of sites
- 9 ☐ One site
- 10 ☐ 2-9 sites
- 11 ☐ 10-20 sites
- 12 ☐ 21+ sites.

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175

NETWORK WORLD

LEAD SERVICE

Issue date July 20, 1992

Card must be received by November 15, 1992

Name
Title
Company
Street
City
State Zip
Phone Fax

☐ ***URGENT***

1. Action requested
- 1 ☐ Request for sales call
- 2 ☐ Request for proposal
- 3 ☐ Request for information

2. Purchase timeframe
- 4 ☐ Within 60 days
- 5 ☐ Within six months
- 6 ☐ Within one year

3. Scope of purchase responsibility
- 7 ☐ Enterprise wide
- 8 ☐ Departmental

4. Purchase influence/number of sites
- 9 ☐ One site
- 10 ☐ 2-9 sites
- 11 ☐ 10-20 sites
- 12 ☐ 21+ sites

101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO.716 PITTSFIELD, MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

P.O. Box 5090
Pittsfield, MA 01203-9838

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO.716 PITTSFIELD, MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

P.O. Box 5090
Pittsfield, MA 01203-9838

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO.716 PITTSFIELD, MA

POSTAGE PAID BY ADDRESSEE

NETWORK WORLD

The Newsweekly of Enterprise Networking Strategies

P.O. Box 5090
Pittsfield, MA 01203-9838

DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

"IBM is beginning to realize the importance of supporting a de facto standard like TCP/IP and a du jour standard like OSI."

Greg Cline
Program manager of
communications technology service
Information Strategies Group
Vienna, Va.
On IBM's increasing support of
TCP/IP on the mainframe

Data Packets

IDEA of Billerica, Mass., has ramped up support of the IBM mid-range 5250 world with enhancements to its IDEAcomm 5251/Gateway Plus and its Microsoft Corp. Windows- and DOS-based terminal-emulation products.

IDEA enhanced its DOS-based IDEAcomm 5251/Gateway Plus to support seven 5250 terminal sessions per gateway card, up from only two previously. Each gateway can support four cards. IDEA also added Novell, Inc.'s Internetwork Packet Exchange (IPX) and mouse support to the gateway.

Additionally, IPX and mouse support was added to the firm's IDEAcomm for DOS and Windows 5250-emulation software products, which were also enhanced with a feature that lets users work on a local spreadsheet while simultaneously bringing down data from the mid-range host.

The IDEAcomm 5251/Gateway Plus will be available Aug. 1 and is priced at $1,210 for 28 users. IDEAcomm 5251 for Windows and DOS are available now for $395 and $150, respectively.

Digital Equipment Corp. has brought out a synchronous communications

(continued on page 12)

Rabbit SNA gateway offers third-party client support

Rumba, MacMainframe are first clients on board.

By Michael Cooney
Senior Editor

MALVERN, Pa. — Rabbit Software Corp. has opened its proprietary Systems Network Architecture gateway to third-party IBM 3270 clients.

Open Advantage Version 5.2 software will let users link personal computers running Avatar Corp.'s MacMainframe and Wall Data, Inc.'s Rumba 3270-emulation packages to Rabbit's DOS-based Open Advantage SNA gateway. In the past, Rabbit's gateway supported only its own DOS and Microsoft Corp.-based Windows 3270-emulation software.

Rabbit's gateway now supports mainframe communications by adding SNA over 802.2 data link-layer support to the Open Advantage gateway. This lets non-Rabbit 3270 clients residing on IBM's Network Basic I/O System, Novell, Inc.'s NetWare or token-ring local-area networks communicate through Rabbit's gateway to the mainframe.

Rumba and MacMainframe are the first third-party emulators to announce support for the new gateway link. Rabbit also announced it will resell those products.

According to Rabbit, IBM's Personal Communications/3270 program has also been tested to work with the gateway. No additional software is required at the gateway for the IBM, Rumba or MacMainframe products.

"Split-stack implementations have some [performance] advantages, but they limit the choices network planners have in workstation hardware and software," said Robert Oliver, director of product planning for Rabbit. "Now our gateway supports Macintosh, NETBIOS, Novell's IPX, OS/2, Windows and DOS clients."

The gateway can support 32 clients configured as downstream physical units, each capable of handling eight sessions with the mainframe. In its proprietary split-stack configuration, the gateway can support 254 clients with one session each.

The ability to add non-Rabbit workstations to the Rabbit gateway has some users looking seriously at the gateway.

American Honda Corp. in Tor-

(continued on page 11)

HP porting management apps to Sun workstations

By Jim Duffy
Senior Editor

PALO ALTO, Calif. — Hewlett-Packard Co. last week brought out new versions of its distributed network backup and print management products that run on Sun Microsystems, Inc. workstations in an effort to broaden their appeal.

The software packages, HP OmniBack and HP OpenSpool, run on Sun SPARCstations under SunOS 4.1.1 or 4.1.2. OmniBack allows net administrators to back up files from Sun workstations and servers to optical and magnetic media, while OpenSpool lets users configure and access printers shared by Sun and HP workstations in a distributed net.

By porting the applications to Sun workstations, HP is looking to increase market penetration of the products. In mixed-workstation environments, HP finds Sun systems taking up more real estate than other systems, said Gordon MacKinney, U.S. programs manager for HP's Colorado Networks Division.

OmniBack and OpenSpool run on every client and server in a network. The applications can be launched from HP's OpenView network and system management console by clicking on icons representing the nodes on which the applications run.

With OmniBack, administrators can initiate SPARCstation file backups from a central OpenView console to an HP UX or HP Apollo Domain workstation. And users can customize OmniBack to perform unattended backups.

OpenSpool is intended to im-

(continued on page 12)

Manning the controls at Vyvx's Television Control Center, from which the company performs remote routing of television signals between 60 cities nationwide over its fiber-optic network.

Fiber net saves video firms time, money

Vyvx fiber-optic T-3 net lets video production companies transmit feeds, cut loose couriers.

By Joanne Cummings
Senior Writer

TULSA, Okla. — In an effort to cut costs and save time, 16 video production companies have turned to Vyvx, Inc.'s fiber-optic T-3 network to transmit video feeds, replacing the use of overnight mail for shipping videotaped material.

Vyvx, a subsidiary of WilTel, operates a T-3 net that was traditionally used only by television stations to transmit live feeds to their headquarters from the place of origin, such as a sporting event. By expanding the scope of its service to include video production companies, the Vyvx network can now be used to support everything from live White House news reports to remote auditions for television commercials.

According to users of the system, Vyvx's fiber net offers production facilities better quality and more secure transmissions than satellite links. It is also more timely and cost-effective than sending videotapes via overnight mail or courier.

"With satellite, the signal quality degrades a little with every hop," said Paul Rush, vice-president and general manager of Gramercy Broadcast Center, the television arm of Burson-Marsteller, a public relations agency in New York that is using the Vyvx net to link with other production facilities across the country. "Also, satellite is easy to tap into. People can buy boxes that descramble satellite signals and, for example, tap into a program for free. That can't happen with fiber."

The 16 facilities, called Vyvx First Video affiliates, typically link to the digital Vyvx net via an analog line that terminates in a Horizon analog switch from Grass Valley Group, Inc. The analog line, known as a TV-1 link, supports one 6-MHz video channel and two 15-kHz audio channels.

The Horizon switch routes the signal to an NEC Corp. coder/decoder. The codec then digitizes the signal and sends it to a Grass Valley DCC-45 digital T-3 switch that provides the link to the Vyvx fiber backbone at one of WilTel's 50 points of presence.

Personnel at a WilTel "war room" here manage the switching from one affiliate to another over the net, according to Kevin Inda, director of public relations at WilTel (see photo, this page).

Until now, the Vyvx network had been used primarily by the major television networks, such as NBC, ABC, CBS and CNN, as an inexpensive, secure way to "back-haul" programs. For example, the network was used to send the raw video feed from a recent Super Bowl game in New Orleans to New York, where it was edited for graphics and commercials and then broadcast over sat-

(continued on page 12)

Before you "bet your business" on another dial modem...

STOP

Consider this:

"If you have LAN-to-LAN, public information service, or other "bet-the-business" communications applications, this is the modem to buy."
--PC Magazine

AT&T Paradyne's COMSPHERE® 3800 Series dial modem family is now priced from **$795**. The COMSPHERE 3810 modem was winner of the 1992 PC Magazine Editors' Choice® Award. Good reasons to give the family serious consideration before you buy.

Consider quality. As *PC Magazine* put it, "the COMSPHERE worked for us every time over every line with every other modem."

Consider investment protection. Upgrades and enhancements can be downloaded over the telephone line--allowing you to quickly adapt your network to new business applications.

PC
MAGAZINE
EDITORS' CHOICE
March 17, 1992
AT&T Paradyne COMSPHERE 3810

Finally, consider value. The **$795** price tag for the new COMSPHERE 3830 modem makes it the best V.32bis value on the market.

So if you're considering dial modems, we'll make it quick and easy for you. For more information on the award-winning COMSPHERE 3800 Series V.32bis family, call **800 482-3333, ext. 555**.
Or fax us at **813 530-2103**.

Visit us at ComNet West booth #854

AT&T Paradyne

PC MAGAZINE EDITORS' CHOICE LOGO, Copyright © 1985 Ziff Communications Company
PC MAGAZINE and PC MAGAZINE EDITORS' CHOICE are registered trademarks of Ziff Communications Company
COMSPHERE is a registered trademark of AT&T

Circle Reader Service #101

McDonnell Douglas uses optical matrix switch to test space link

By Jim Duffy
Senior Editor

TITUSVILLE, Fla. — McDonnell Douglas Space Systems is counting on the speed of light to accurately assess the operation of space station communications and tracking systems.

McDonnell Douglas Space Systems has purchased a photonic matrix switch manufactured by Astarte Fiber Networks, Inc. in Boulder, Colo., to test a simulated link from an orbiting space station to a satellite ground station. The test, to be conducted on the ground at the Kennedy Space Center here, will measure the throughput and integrity of traffic on the simulated link.

Astarte's Star-Switch Model 1600 connects multiple computer, telecommunications, video and cable television devices over point-to-point fiber-optic links. Fibers are connected to the switch through a connector panel or they can be spliced directly into a switching module.

The switch, which fits into a 19-in. equipment rack, supports 16 input and 16 output fiber ports. It switches optical signals with a bandwidth of 300 to 500M bit/sec and supports a switching speed — the time it takes to connect one network to another — of 50 msec, Astarte said.

Line speeds between switches are limited only by the transmission equipment between them, said Ken Garrett, Astarte's vice-president of sales and marketing. The McDonnell Douglas Space Systems network is running at 50M bit/sec, he said.

McDonnell Douglas Space Systems will use the Astarte switch to connect the space station's communications and tracking system to testing and monitoring equipment. The communications and tracking system sends data from space station experiments to Earth-based ground stations.

The testing equipment includes tape recorders, bit error rate recorders and packet analyzers to monitor the packet processing and error detection and correction capabilities of the communications and tracking system. The traffic includes audio, video, and low- and high-bit data rates.

McDonnell Douglas Space Systems chose a photonic matrix switch because it cannot afford the delays inherent in optical-to-electrical conversion when using fiber optics and an electrical matrix switch. Moreover, electro-optical converters introduce another potential source of error into the transmission link.

"Fiber to electrical delays become touchy," said Keith Perry, a senior engineer at McDonnell Douglas Space Systems. "We're just removing things that could go wrong."

The Astarte switch can also be used in other bandwidth-intensive networks, such as those used by public utility, medical, telecommunications, education and research, and cable television and broadcasting companies. ◘

SNA gateway offers third-party support

continued from page 9

rance, Calif., uses a variety of workstations, including the graphics-oriented IBM AT/G. In the past, these devices had to communicate with the mainframe separately through a 3174.

"Because of the AT/G's special graphics control program, it couldn't join a token-ring network as a [logical unit] through a Rabbit gateway," said John Tyson, a strategic planner in American Honda's Information Systems Division. "With Open Advantage 5.2 the AT/Gs can be downstream [physical units] on a token ring, eliminating the need to redefine the workstations as separate units."

Eric Fairhurst, an information center analyst with Delta Faucet Co. in Indianapolis had some Rumba-based workstations on his Novell LANs that needed a gateway to the mainframe.

"We have Rumba clients and looked at the Rumba gateway, but it didn't have the management features the Rabbit gateway did," Fairhurst said. "When Rabbit added support for Rumba, it removed a major roadblock for us."

Open Advantage 5.2 will be available in the third quarter, about a month after Version 5.1, Oliver said. The upgrade will cost 10% of what the customer paid for the Rabbit gateway. New users will pay $1,495 for an eight-session version of the software and up to $9,995 for a 254-session version. The Open Advantage gateway will cost between $1,395 and $4,290, depending on configuration. ◘

Always a Next Step.
With Global Communications From BT.

Going Further

With every forward step into the world marketplace, you expect greater success, better solutions. Not a different set of problems.

So you look for a global communications partner who has been there, who has managed cultural, compliance, currency, and language issues. One company who makes it all happen, while you take care of the business at hand.

BT™ has a global presence that our competition can't match. The TYMNET® Global Network (TGN), with the largest market share among U.S. value-added networks, supports Global Network Services (GNS℠) that reach 90% of the world's business centers in more than 100 countries. Half of Europe's multinationals use our services.

GNS links your international divisions. Then we monitor and support those links worldwide, bill in one currency, and offer a portfolio of applications—a single-vendor solution that makes your life easier.

Staying Closer

When BT is there for your global communications program, you have a consulting partner who'll help plan your network… customize and simplify… make sure everything plugs in where it should at locations worldwide. If you want, we'll manage it end-to-end.

But we know that partnership goes beyond just making things work. It means understanding your business strategies and corporate culture… tailoring solutions to meet your challenges, matching our global technology to your local needs. Helping you go further with your business, and stay closer to your customers.

Before you take the next step, call 1-800-872-7654 (US) or 1-800-874-7654 (Canada) for more information and our Going Further Staying Closer brochure.

Global Network Services
ExpressLANE™
Frame Relay
Videoconferencing
EDI*Net®
BT Messaging Services
Electronic Transaction Services

BT™

Circle Reader Service #104

© British Telecommunications plc 1992 2025-205D

Fiber net saves video firms time, money

continued from page 9

ellite to network affiliates.

Now production facilities can use the same network to provide a host of services.

According to Liz Lokey, director of marketing at Professional Video Services Corp. (PVS), a video production facility in Washington, D.C., the Vyvx net serves as an equalizing force for small independent stations to compete with the major networks.

PVS has used the network to tie in two locations at the White House — one on the front lawn and one in the briefing room. From these locations, independent stations that pay PVS a fee can have their reporters use PVS' crew to broadcast news stories in a timely, efficient manner.

"The four major networks have their own locations and lines [at the White House]. But if you're not one of those guys, it's very difficult to do anything live from there," Lokey explained.

The network also saves time and money for its users, according to Rush. For example, Gramercy used the network to handle a casting call for a TV commercial being produced by Young & Rubicam, a large New York-based advertising agency and parent company of Burson-Marsteller.

"They wanted to consider actresses in both New York and L.A. for a part in a commercial," Rush explained. "Rather than flying the casting director out to L.A., we used the Vyvx network and auditioned the actresses via the television link to the Vyvx affiliate in L.A."

The casting was completed in about two hours, and a decision was made right on the spot, he said. "Since they were casting a television commercial, viewing the actresses via a broadcast-quality video link was a better indication than if they had viewed them in person," he added.

Rush said his company is also looking to provide a service whereby production houses can use Gramercy's Vyvx link to more cost-effectively send stock video footage to television stations nationwide.

"That would enable them to receive the video immediately," he said. "Now we rely on Federal Express [Corp.] for overnight tape delivery or on flying couriers to the cities that need the footage. That's pretty expensive."

Rush also said the digital network could have a major impact on the future of television when production facilities start using high-definition television (HDTV).

"HDTV should be a major part of the television industry in '95 or '96, and digital will be the way to go," he said. Satellite will be inefficient because HDTV's bandwidth will demand more than one transponder, and the send and receive satellite dishes will need to be much larger than today's units, he said. "Digital facilities will be more secure and less expensive." ◼

In the heart of the financial district, fault tolerance means never missing a beat.

LANNET
DATA COMMUNICATIONS INC.

The failsafe future of networking.

From the moment the bell sounds, the atmosphere is volatile, the action fast and furious. Crash protection means everything here, because the financial community can't afford downtime. That's why banks, securities companies and exchanges are keeping their LANs up and running with a MultiNet™ hub. ☐ LANNET's smart LAN hubs give your networks the same level of reliability. MultiNet's fault-tolerant hardware can detect a failure and respond in microseconds...faster than any software-based system, and without any user-level effects. Should any part of your network fail, MultiNet's modular, hot-swappable design allows rapid maintenance while the rest of your network keeps running. ☐ Reliability is further enhanced by a fully distributed design, backup links on every media type to the desktop level, redundant power supplies, backup segments and extensive diagnostics. ☐ MultiNet also offers unmatched flexibility, supporting any multiple-segment mix of Ethernet, Token Ring, FDDI, LocalTalk and RS232—all within the same hub, all managed through LANNET's centralized, SNMP-compliant MultiMan. ☐ Your company's LANs can't afford to miss a beat. And for fault-tolerant operation, nothing beats MultiNet. For more details, call LANNET today.

Tel: 714·891·5580 Fax: 714·891·7788

7711 Center Avenue, Suite 600, Huntington Beach, CA 92647

©1992 LANNET DATA COMMUNICATIONS INC.

Circle Reader Service #105

HP porting mgmt. apps to Sun

continued from page 9

prove the user interface of Unix-based print spoolers and ease the task of configuring print devices and queues.

Through a graphical interface, users can easily handle various forms, fonts, paper types, printers and plotters, HP said. Moreover, systems administrators need to make configuration changes to a system only once and those changes are automatically replicated to all networked systems.

OpenSpool is based on the Palladium technology that was selected by the Open Software Foundation, Inc. for its Distributed Management Environment. Palladium is a distributed print management application from MIT's Project Athena.

Pricing for HP OmniBack starts at $1,500 and $3,000 for OmniBack/Turbo, the software for backing up databases. HP OpenSpool starts at $400. All products will be available on Sun platforms in September. ◼

Data Packets

continued from page 9

controller for its Reduced Instruction Set Computing (RISC) systems and servers.

The WANcontroller 720 attaches to the 100M byte/sec TurboChannel bus of a DECstation or DECsystem workstation and connects users of those systems to Transmission Control Protocol/Internet Protocol, X.25 and DECnet wide-area nets. It allows users to transmit graphics, share electronic mail, access remote applications and transfer files at up to T-1 speeds.

The WANcontroller costs $2,500 and is available now.

Meanwhile, DEC and Metrix Network Systems, Inc. of Nashua, N.H., have signed a joint marketing agreement to resell net management software. Under the agreement, DEC will offer Metrix's NetMetrix net monitoring and analysis software to DEC's Management Station for Ultrix users. ◼

Build strong networks eight ways.

Today, no company can afford networks that fail. Here's Chipcom's recipe for healthy networks that keep running.

1. Automatic self healing. With Chipcom's ONline™ System Concentrator, networks can automatically reconfigure themselves around faults. And keep running, without users even being aware a problem exists.

2. Port-switching flexibility. When performance slows, or a segment stops, you can simply switch users from the offending network to a backup.

3. "No sweat" hot swaps. Virtually any element of the network, including power supplies, repeaters, MAUs, terminal servers, bridges and routers, can be replaced as needed without disturbing network users.

4. Built-in redundant power supplies, including dual power cords for no-interruption service.

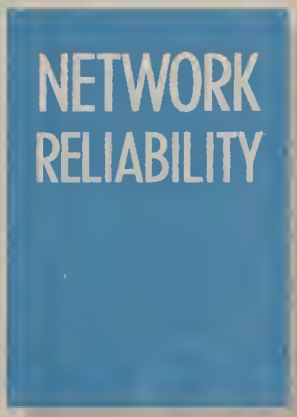
5. Cable/link redundancy when and where you need it, regardless of the media you're using: Fiber, shielded or unshielded twisted pair, co-ax, or any combination.

6. Fault-tolerant bridging, too. Chipcom offers fault-tolerant bridge modules capable of accommodating link failures.

7. Network Control System software. Software that lets you perform an autopsy after the network dies isn't much help. Our NCS software is designed to help your network self-heal, so the network stays up until—and while—you repair the fault.

8. Not even the CFO can fault it. Because with Chipcom, you leverage your network investment. You slash the cost of network downtime and maintenance. And you build a network that neither technology nor your company's growth will obsolete.

And those are pretty strong arguments. No matter how you slice it.



LEARN HOW TO BUILD A STRONGER NETWORK.

Avoid the major causes of network failure.

For your free copy, call:

1-800-228-9930.

CHIPCOM™

ONline is a trademark of Chipcom Corporation.

© 1992 Chipcom Corporation, Southborough Office Park, 118 Turnpike Road, Southborough, MA 01772

Circle Reader Service #112

OS/2 2.0 is here to stay.

This special $49 offer isn't.

Run DOS applications. Run Windows™ applications. Run OS/2* applications. OS/2 2.0 can let you run them all—all at once, in separate windows on the same screen. With so much to offer, OS/2 2.0 will be around for some time. But these low prices won't.

For a limited time, you can upgrade to OS/2 2.0 from Windows for just $49; $99 from any DOS. That's a lot less than the cost of DOS and Windows. And OS/2 gives you the capabilities of both. Plus all the added benefits of OS/2 2.0—including Adobe Type Manager.™

In fact, at these special introductory prices, no other operating system can let you do so much. For so little. For an IBM authorized dealer near you, or to order OS/2 2.0 from IBM at these special introductory prices, call the number below. Call now and receive a **free** copy of the OS/2 Workplace Shell™ video with your order.*

Call 1 800 3-IBM-OS2.**

- *Runs DOS, Windows and OS/2 programs.*
- *Runs more than one program at a time.*
- *Supported on most 386 SX PCs and above.*
- *Upgrade from Windows to OS/2 2.0 for $49; $99 from any DOS.†*

IBM

*Limited to while supplies last. **In Canada, call 1-800 465-7999. †Upgrade from Windows, $49; upgrade from any DOS, $99; $139 base operating system. These prices valid only when ordered directly through IBM. Proof of purchase required. Dealer prices may vary. Offer valid in U.S.A. only; expires 7/31/92. Shipping and handling not included. IBM and OS/2 are registered trademarks and Workplace Shell is a trademark of International Business Machines Corporation. All other products are trademarks of their respective companies. © 1992 IBM Corp.

LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

Worth Noting

> "Good [desktop] clients have been about as available as Red Sox fans in New York."
>
> **Art Olbert**
> Personal systems director
> of LAN systems
> IBM
> Somers, N.Y.

Netnotes

Beame & Whiteside Software, Ltd. has announced what it claims is the smallest Simple Network Management Protocol kernel available. It will be integrated into Version 3.0 of the firm's BW-TCP and BW-NFS Transmission Control Protocol/Internet Protocol client software for DOS and Microsoft Corp. Windows environments.

The compact kernel enables DOS and Windows clients to be supported by SNMP-based management systems while only sacrificing about 2K bytes of random-access memory on the client workstation. Carl Beame, president of Beame & Whiteside Software, said competing products take up at least 34K bytes of workstation RAM.

BW-TCP 3.0 and BW-NFS 3.0 will be available by the end of the month, although pricing has not yet been established.

Buffalo Products, Inc. last week brought out a complete peer-to-peer network for DOS and Microsoft Corp. Windows environments made up of what the company said are industry-standard components. Called Complete Network, the package contains Webcorp's WEB 3.0 network operating system, Intel Corp.'s EtherExpress 16 network adapters, cabling, connectors and more.

Complete Network is available now in two-, five-, 10-, 15- and 30-node configura-

(continued on page 18)

DG stresses reliability with its two new AViiON servers

New models use DG RAID storage technology.

By Margie Wylie
Senior Editor

WESTBOROUGH, Mass. — For users that just can't afford downtime, Data General Corp. last week announced two new Unix servers that take advantage of second-generation RAID storage technology, which the company also introduced last week.

The two new server models expand DG's AViiON line at both ends, but more importantly, they take advantage of DG's new High Availability Disk Array (HADA) II. HADA II is a Redundant Array of Inexpensive Disks (RAID) implementation designed for businesses that rely on their network for transaction-intensive applications, such as order entry, and need the network to be available all the time.

"Just like multiprocessing had a big impact on price/performance in the PC area, the concept of disk arrays is having the same impact for networks," said Joe Clabby, director of AViiON Systems. "[RAIDs] provide much lower cost per megabyte but also offer much higher reliability," he said.

HADA II offers redundant I/O processors, which not only speeds data storage and retrieval but also monitors disk usage, maintains data about parity and reroutes data from damaged disks. HADA II also supports redundant fans and power supplies.

Additionally, RAID allows users to remove and replace damaged components — disks, controllers, power supplies and fans — while the disk array is under power.

Due in August, the system will work with both of the DG servers announced last week and has a starting price of $35,000.

Due in the fourth quarter and starting at $200,000, the AV 6280 and the AV 8000-8 will top the high end of the company's mid-range systems. These new servers offer as many as eight Motorola, Inc. 88100 RISC CPUs, compared to DG's former top-of-the-line quad-processor systems.

The servers also offer two-level data and instruction caches to speed processing. Each processor has its own 128K-byte cache with a 1M-byte cache shared between

(continued on page 16)

TokenPeek turns the Mac into a protocol analyzer

By Margie Wylie
Senior Editor

SANTA CLARA, Calif. — The AG Group, Inc. last week added a token-ring analyzer to its line of software-only protocol analyzers for Apple Computer, Inc.'s Macintosh.

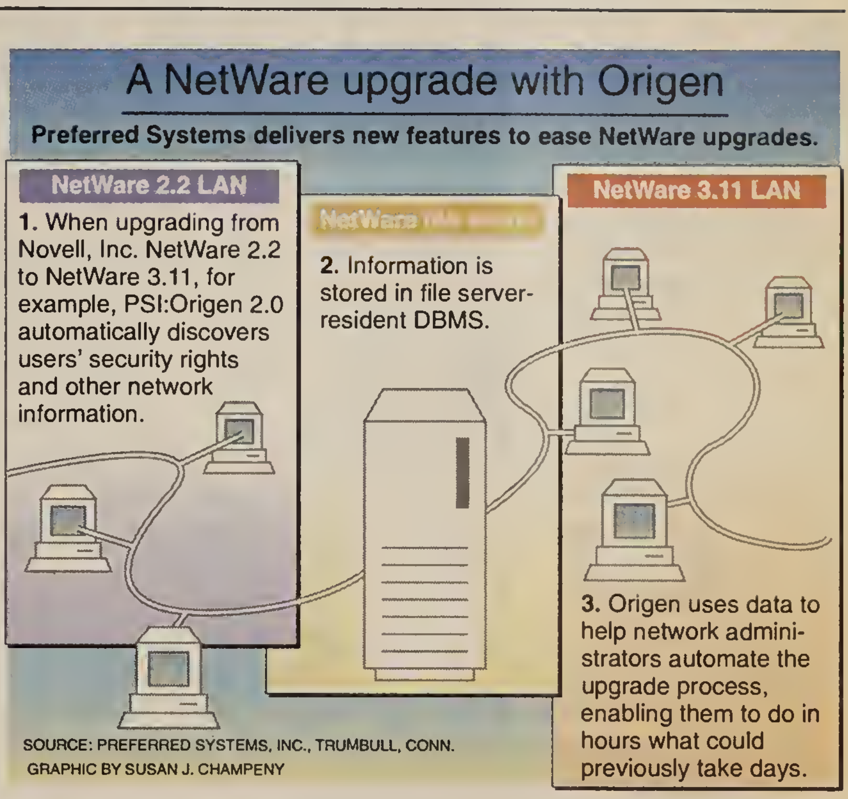
Due in the third quarter, TokenPeek is software that lets any Macintosh station attached to a token-ring network capture, display and analyze traffic in a mixed network. An economical alternative to dedicated analyzers, the software also draws on the Macintosh interface, using point-and-click operations, icons and color to make sleuthing out network quirks more palatable than monochrome or command-line troubleshooting tools.

TokenPeek is made to minimize or eliminate the need for dedicating expensive, specialized hardware to packet analysis. The $995 program fits on a single disk, which allows managers to capture, decode and analyze network protocols from any Macintosh on a token-ring network.

In comparison, personal computer-based analyzers — which are priced between $5,000 and $20,000 for software and hardware dedicated solely to the task of analysis — often require users to lug and then attach an entire portable system to the troubled location.

TokenPeek lets users capture and analyze Transmission Control Protocol/Internet Protocol, Simple Network Management Protocol, IPTalk, Novell, Inc.'s Internetwork Packet Exchange (IPX), Banyan Systems, Inc.'s VINES, Digital Equipment Corp.'s DECnet Phase IV and Local Area

(continued on page 18)



A NetWare upgrade with Origen

Preferred Systems delivers new features to ease NetWare upgrades.

NetWare 2.2 LAN
1. When upgrading from Novell, Inc. NetWare 2.2 to NetWare 3.11, for example, PSI:Origen 2.0 automatically discovers users' security rights and other network information.
NetWare file server
2. Information is stored in file server-resident DBMS.
NetWare 3.11 LAN
3. Origen uses data to help network administrators automate the upgrade process, enabling them to do in hours what could previously take days.

SOURCE: PREFERRED SYSTEMS, INC., TRUMBULL, CONN.
GRAPHIC BY SUSAN J. CHAMPENY

Origen eases pain of NetWare upgrades

Preferred Systems application helps managers plan, implement and analyze NetWare upgrades.

By Caryn Gillooly
Senior Editor

TRUMBULL, Conn. — With many Novell, Inc. NetWare users facing multiple upgrades due to the stratification of the LAN giant's product line, a company called Preferred Systems, Inc. is offering a way to ease the upgrade pain.

Last week, Preferred Systems, based here, released PSI:Origen 2.0, an application that helps administrators plan, implement and analyze enterprisewide NetWare upgrades and reconfigurations.

"Upgrading is a major concern today for our clients using NetWare. NetWare 2.X users are looking at 3.11, and all users are trying to position themselves for NetWare 4.0," said Mark Freund, president of the Interconnect Network Consulting Group based in Santa Monica, Calif.

Origen 2.0 is software that resides on the NetWare file server and includes a server-resident database management system. The previous version consisted only of the DBMS, while this latest release includes features specifically targeted at customers looking to upgrade and document data about their nets.

To help with upgrades, Origen automatically reads information, such as user names, directories and access rights, from existing NetWare servers and stores it in its database. From there, the network administrator can edit the configuration to rework the current network or write the same configuration to an upgraded file server.

Reconfiguration can also be done off-line, so the planning of a new configuration will not disturb end users.

> Origen automatically reads information from NetWare servers and stores it in its database.

▲▲▲

Once the upgrade plans are set, the administrator only has to run a program within Origen and the system will automatically configure the new server as planned. Plus, passwords will automatically be created for users, and security rights will be put in place based on information discovered from the existing server.

"This basically lets you generate a new server off-line from the server you've already got. It then

(continued on page 16)

Origen eases pain of NetWare upgrades

continued from page 15

takes hours — vs. days — to bring up the new network," said Don Barry, a network administrator at Houston-based Landmark Graphics Corp., a beta site for Origen 2.0. "If you have multiple NetWare servers, you're killing yourself if you don't at least look at this. It makes my job much easier."

Another feature users found helpful is what Barry referred to as "exception reporting." In order to solve net problems, other available packages give administrators the capability to print the entire NetWare bindery, which houses all NetWare directory, network and user information.

Therefore, if the administrator is looking for a problem, he would have to manually search the entire bindery to find, for example, two users with the same password.

With Origen 2.0, however, the administrator can print items in the bindery that are unusual, rather than printing all the information and wading through it.

"The bindery reporting capability saves us a lot of time," said Rick Chamberlain, vice-president and network engineer at Data Systems Development Corp., a systems integrator based in Milwaukee and a beta site for Origen 2.0.

"First of all, it lets us extract specific information from the server to help in redesigning a system," he said. "But it also helps in diagnosing problems. Before, if there was a problem with the network, we literally had to hack around, printing out random login scripts until we found out what was wrong."

With Origen's database, the administrator also has comprehensive documentation on all NetWare bindery objects, such as users, groups, print queues and print servers, as well as a table of contents to keep the information in order. Neither Barry nor Chamberlain knew of any product available today that provides this centralized documentation capability.

According to analysts, such documentation is another way to help in the upgrade process. "NetWare 4.0 includes directory services technology that is very attractive to large users of NetWare," said Jack Karp, vice-president of desktop strategies at the META Group, a consulting house based in Westport, Conn. "However, this new technology also brings challenges.

> "If you have multiple NetWare servers, you're killing yourself if you don't at least look at this," Barry said.

▲▲▲

"MIS must start to clean up their environment today in order to prepare for this technology tomorrow," he continued. "To successfully implement NetWare 4.0, corporate standards and server documentation must [already] be in place."

Origen 2.0 is available now and is priced at $495 for the first server and $295 for each additional server. All existing Origen customers are eligible for a free upgrade to the product. ☑

DG stresses reliability with AViiON servers

continued from page 15

each pair of processors in the machine. Files and processes most recently or frequently accessed are stored in random-access memory to provide faster access and to speed server performance.

Available now, the 4605 series will start at the $19,995 price tag of its predecessor, the 4600 line, but will offer a 96K-byte data and instruction cache, which improves performance by as much as 40%, DG officials claimed.

Based on the Motorola 88100 RISC processor, both the single-processor 4605 and dual-processor 4625 come with 32M bytes of RAM (expandable to 128M bytes), 520M bytes of internal data storage (expandable to 1.7G bytes), a 525M-byte tape cartridge backup drive, two VMEbus slots, and on-board Ethernet and Small Computer System Interface connections.

The company also last week started shipping with all its servers a new version of its Unix operating system, DG/UX 5.4.2 for AViiON systems.

The new version will be able to use all eight of the processors offered in the maximum configuration of the new AV 6280 and AV 8000-8 servers. By spreading its computing tasks to run over several CPUs simultaneously, a feat called symmetric multiprocessing, DG/UX 5.4.2 can best a single processor AViiON system's performance by 10 times, DG officials said. ☑

Companies all across the country have conquered their fear of outsourcing and learned the truth–outsourcing saves time and money. "We anticipated network growth, so flexibility was important," said Demo Tsagarakis, MIS Director for Alpha Corporation. "Cost effectiveness in outsourcing our data network included not only data transmission costs but reducing our staff time in monitoring and managing the network." Companies have also discovered that the change to outsourcing isn't as much trouble as they thought: "Making the switch from AT&T to Cylix was no more disruptive to our operations than installing a fax line," said Robert Smith, IS director for Electrical Insulation Suppliers. And smaller companies have learned

The Talk About Outsourcing.

that outsourcing isn't just for the big guys: "At first we didn't feel we were large enough to consider outsourcing. However, selectively outsourcing our data network provides for more time to concentrate on our applications," said Harold Atkins, corporate secretary of Churchill Truck Lines. When you outsource with Cylix, we manage your data network for you. We order, install, manage and maintain all communications equipment and leased lines. All for one monthly fee that can save you at least 10% on the operating costs of trying to do it yourself. Get the full scoop on outsourcing. Call us at 1-800-234-2954 and we'll send you *The Talk About Outsourcing*, a collection of case studies on outsourcing, absolutely free.

Cylix COMMUNICATIONS CORPORATION

The Data Network Experts.

A subsidiary of France Câbles & Radio

800 Ridge Lake Boulevard, Memphis, TN 38120-9404 Phone 1-800-234-2954

©1992 Cylix Communications Corporation

Circle Reader Service #103

WHY TELCOS WORLDWIDE GO DIGITAL WITH GDC.

When it comes to the products needed to take advantage of new, lower-cost digital services, the telephone companies themselves are the digital world's most demanding customers.

So it's no surprise that, for the last 20 years, more telcos have chosen General DataComm digital products than any others. All seven regional Bell operating companies are long-term GDC customers, as are numerous other telcos worldwide.

Data Comm
MAGAZINE
USERS'
CHOICE

A large number of private network users also contribute to GDC's installed base of more than 250,000 terminations. Why? For the same reasons these customers voted the Users' Choice award to GDC's T1 CSU, the DataComm 551, in a recent DATA COMMUNICATIONS magazine survey.

Users praised the DataComm 551 for its high reliability, conformance to all carrier specifications, ease of use, ease of setup, overall functionality, and adherence to new standards and services. These are all qualities which are designed and built into every GDC digital product.

Three GDC product families cover the complete spectrum of cost-competitive solutions for all digital applications. Among them, the user is offered all speeds, from 1.2 Kbps to 1.536 Mbps; multiple diagnostic routines; and maximized packaging flexibility.

The DataComm Series provides GDC's exclusive DataCommonality rack or standalone enclosure mounting options. The DeskTop Series combines advanced technology with an attractive, low-profile design. And the NMS Series adds full network management capabilities.

These products offer features such as extended range for reliability over long distances; a new LPDA-2 option for diagnostic compatibility in NetView environments; flexible, cost-effective interfaces to fractional T1 services; 2B1Q line coding for enhanced digital network access; and support for new T1 encoding and framing methods, allowing easy migration to future service offerings.

To make the right investment in your digital future, contact General DataComm today. To connect with GDC, call 1-203-792-0542. In North America, call toll free 1-800-777-4005.

General DataComm

WORLD CLASS NETWORKING

WORLD HEADQUARTERS 1-203-574-1118   HONG KONG 852-526-5511   CANADA 1-416-498-5100   AUSTRALIA 61-2-956-5099   UNITED KINGDOM 44-734-774868
EUROPE, AFRICA, MIDDLE EAST HEADQUARTERS 33-1-30570200   JAPAN 81-3-3862-1730

Circle Reader Service #113

TokenPeek turns Mac to protocol analyzer

continued from page 15

Transport, Xerox Corp.'s Xerox Network Systems, Apple's AppleTalk Update Routing Protocol and the entire AppleTalk stack. TokenPeek will also capture other protocols that run on token ring, such as IBM's Systems Network Architecture or EBCDIC, but it will only show header information and cannot decode packet contents. Header information tells net managers in what protocol the packet is formatted and provides addressing information.

Like The AG Group's LocalPeek for LocalTalk networks and EtherPeek for Ethernet networks, TokenPeek takes advantage of the Macintosh's simple interface. It lets managers color-code captured packets by key characteristics, including type, length and destination. Managers get more information about a packet by simply double-clicking on a line of text. And traffic and packet statistics are displayed in color-coded bar graphs.

TokenPeek can also lend its simple interface to data gathered by a dedicated analyzer. The software can import captures from Network General Corp.'s Sniffer and Novell's LANalyzer.

"If you've already spent $10,000 on a Sniffer to keep on-line, then you can import that data into EtherPeek for easy interpretation," said David Burke, director of marketing for The AG Group.

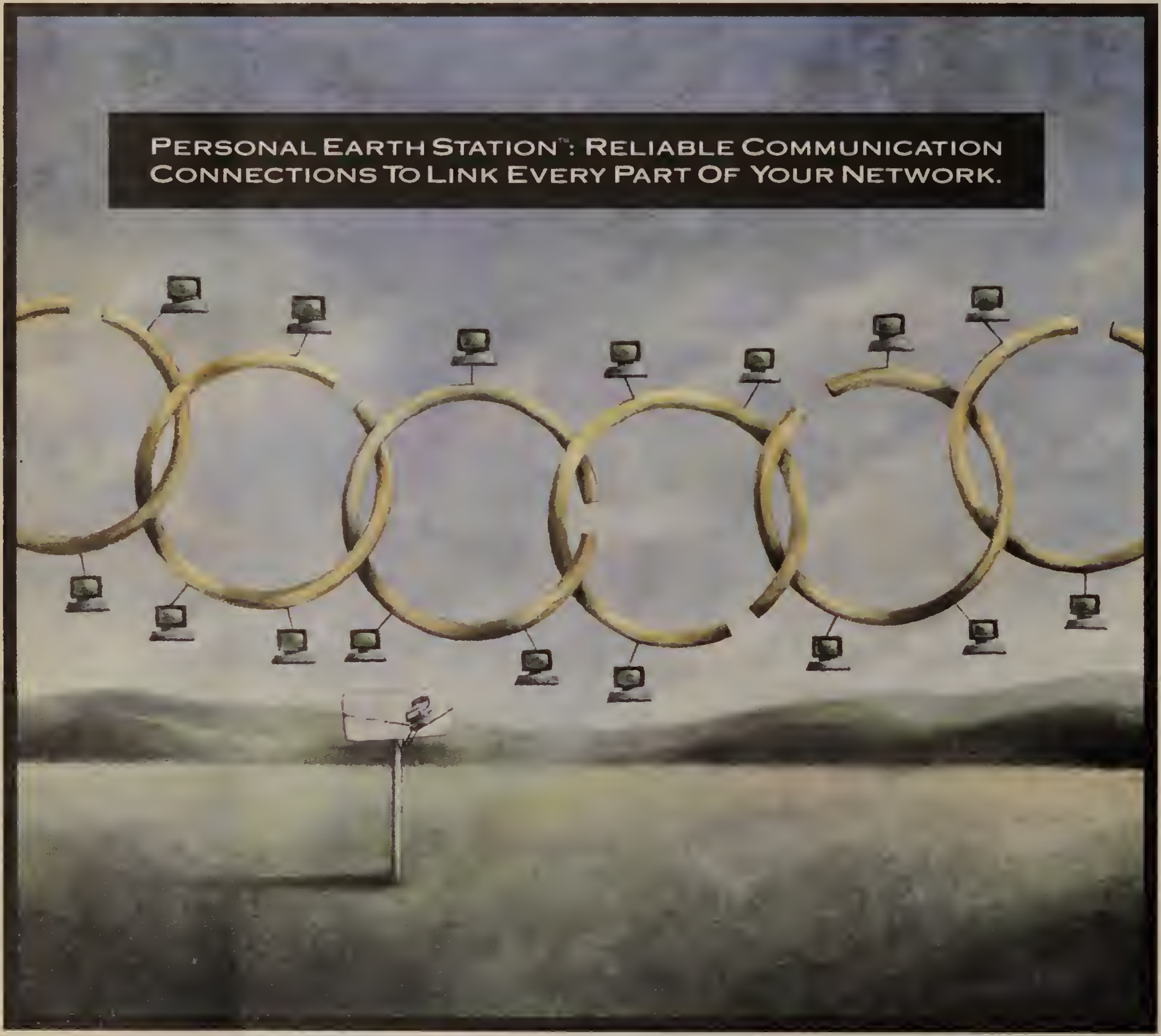
The software can also generate random network traffic or even replay a series of captured packets to help managers diagnose network problems. The Macintosh interface lets managers assemble that series through simple cut-and-paste commands.

TokenPeek can automatically trigger captures or send the user alarms on various events, such as an error condition or when network traffic exceeds a certain level. It alerts the user through visual or audio clues or can send a pager alert through third-party paging software sold separately.

TokenPeek works in a heterogeneous environment, but its makers will be the first to acknowledge that Macintoshes are not often connected directly to token-ring networks with other types of machines.

"We hope that changes soon," Burke said. "With the Apple-IBM alliance, we are seeing more Macs on token ring." However, until more Macintosh applications use TCP/IP or another protocol more acceptable to managers of token-ring networks, that's unlikely.

"We're waiting for someone to make a token-ring card for the PowerBook [Macintosh laptop computer]," Burke said. With a token-ring card installed, managers could use the PowerBook running TokenPeek as a portable analyzer, he said. ◻


PERSONAL EARTH STATION™: RELIABLE COMMUNICATION CONNECTIONS TO LINK EVERY PART OF YOUR NETWORK.

Today, top organizations around the world have turned to satellite communications as an affordable, high-quality source of LAN interconnection for their business networks. In fact, for 70% of interactive VSAT installations—in such industries as banking, retailing, energy and hospitality—the choice has been the international leader in satellite communications: Hughes Network Systems.

Hughes Personal Earth Station™ VSATs offer full data, voice and video services.

The system provides superior support for distributed processing such as broadcast file transfers, LAN internetworking, and interactive data applications. With full bandwidth available and supplied on demand, it offers a true LAN*Advantage*™ to handle bursty LAN traffic. Our graphics-based network management system provides full support for common network functions and value-added applications.

For a connection to link every part of your network, call us at (301) 428-5500, ext. 3751.

HUGHES
NETWORK SYSTEMS
Subsidiary of
Hughes Aircraft Company

HUGHES
Subsidiary of
GM Hughes Electronics

Hughes Network Systems, Inc., 11717 Exploration Lane, Germantown, Maryland 20876
Personal Earth Station and LANAdvantage are trademarks of Hughes Network Systems, Inc.

Circle Reader Service #114

Netnotes

continued from page 15

tions, starting at $395 for the two-node starter package. The firm is also offering its Add-A-Node Package at $225 per node.

Avanti Technology, Inc. has released NetScope 1.1, a real-time protocol analyzer for Novell, Inc. NetWare local-area networks that now supports Novell's Burst Mode Protocol. For each Burst Mode Protocol frame, NetScope checks source and destination connection identifications, socket numbers and packet sequences, in addition to monitoring the beginning and end of each transaction.

NetScope lets the administrator perform real-time protocol analysis of network transactions among eight servers.

Pricing starts at $1,475 for Ethernet connections, $1,550 for ARCnet and $1,900 for token ring. Version 1.1 is available now.

Digital Communications Associates, Inc. last week announced a new version of its Irmalan Client for Windows that now supports Microsoft Corp.'s Windows 3.1 and All Points Addressable graphics. The combination of the two lets users access host graphics from their personal computers. The basic Irmalan Client for Windows product is software that lets multiple local-area network users communicate with an IBM mainframe through an Irmalan/EP Gateway. Version 2.0 will be available next month for $3,995.

InterCon Systems Corp. has unveiled InterPrint, a software utility that lets Macintoshes print to PostScript printers attached almost anywhere on a Transmission Control Protocol/Internet Protocol network.

Selling for $995 for 10 users, InterPrint is client software based on the Berkeley Line Printer Resource/Line Printer Daemon (LPR/LPD) Unix print protocol. Using the utility, Macintosh users will be able to print to any PostScript printer attached via the LPR/LPD protocol. ◻

Networking & MIS Professionals:

Tell us what you need.

Falcon's selection of key products...

Falcon's Networking Team includes some of the biggest names in the business. And some of the smallest.

Because we carry a complete line of LAN, WAN, and enterprise networking products, we can quickly deliver key components your network needs.

Whether you're installing a single node on an existing network or implementing a new enterprise-wide system, Falcon is your one-stop connectivity provider.

Here are a just a few of the key vendors playing on the Falcon Networking Team:

Ungermann-Bass
Your global network integration partner

Ungermann-Bass integrates your existing hardware and software into a single manageable network that supports globally-distributed, mission-critical applications. Falcon represents Ungermann-Bass to customers in the Washington region and to the entire Federal government.

WELLFLEET communications

Wellfleet offers a family of high-performance multiprotocol routers. The Feeder, Link, Concentrator, and Backbone Nodes use Wellfleet's Advanced Communications Engine to provide multi-vendor connectivity for LANs and WANs.

NetWorth™
An Ungermann-Bass Partner

NetWorth's Series 4000 Intelligent Hub provides manageable connectivity for departmental Ethernet networks. Recently, NetWorth announced its exclusive NetWare Application Engine, providing a brand new method for centralizing NetWare communications services right in the hub.

Apple Computer

Falcon also represents manufacturers of AppleTalk products including Apple, Farallon, and Shiva.

For more information on Falcon's networking products return our coupon or call (301) 386-8590.

☐ **Yes!**

Please send me complete details on these Falcon network products...

- ☐ Ungermann-Bass Access/One networking products.
- ☐ Wellfleet routers.
- ☐ NetWorth intelligent hubs.
- ☐ Novell NetWare products.
- ☐ AppleTalk networking.

☐ **Wait!**

I need both! Please send details on Falcon's entire range of networking products & services!

☐ **Okay!**

Please send me complete details on these Falcon network services...

- ☐ Network analysis and design.
- ☐ Network installation.
- ☐ Networking training.
- ☐ Services for systems Integrators.
- ☐ Other:

☐ **Hurry!**

It's an emergency. Please call me with your latest product and pricing information.

To receive the service or information you need, please mail or fax this request to: **Falcon Network Integration**, 1100 Mercantile Lane, Landover, MD 20785. For faster service, kindly call the number below.

Name

Position/Title

Agency/Organization

Address

Mail Stop or Room Number

City State Zip

Business Phone

NWW 1 2 3 4 5 6 7 8 9 10 11 12

Call: 301-386-8590
Fax: 301-386-6424

Ungermann-Bass is a registered trademark and the Ungermann-Bass logo is a trademark of Ungermann-Bass, Inc.
NetWorth and the NetWorth logo are trademarks of NetWorth, Inc. Wellfleet and the Wellfleet logo are trademarks of Wellfleet, Inc.
Apple, the Apple logo, AppleTalk, and Macintosh are registered trademarks of Apple Computer, Inc. All other trademarks are proprietary to their respective owners.

Or Falcon's networking services and training.

Whether you're an IRM professional, a systems integrator, or a non-technical manager, you know that networking almost any organization represents a tremendous opportunity.

But implementing such a network is also a tremendous challenge: it's hard to know which solutions work best together, which represent the best buy, and which are flexible enough to accommodate your future needs.

Let us help.

If you've been tasked with responding to these tough questions, the team of Falcon and its vendor partners has just what you need: complete professional assistance. Our engineers, installation professionals, and project managers make networking manageable by:

- Analyzing your current and future connectivity needs.
- Reviewing your network designs.
- Recommending proven products.
- Creating implementation strategies.
- Providing expert installation, maintenance, and training services.

It's this simple: the Falcon Team is your partner when it comes to solving your network problems. We will support you in managing your network with design, installation, project management, and maintenance services. Or, we can provide such services directly.

Return this coupon or call (301) 386-8590 for more information on products and services from the Falcon Networking Team.

Falcon
Network Integration

The inside story on hubs and routers.

While everyone is talking about the future benefits of integrating hubs and routers, Ungermann-Bass is delivering these benefits today.

It's clear that the effective integration of intelligent hubs and multiprotocol routers results in a much lower cost of LAN ownership — plus greater network flexibility, performance and availability. So why wait?

"LAN users deserve products with smooth migration paths that protect their investment and provide for the future." Ralph Ungermann–President, CEO

The Ungermann-Bass Access/One® Enterprise Hub, with its high-speed RISC-based message switching infrastructure, meets today's most demanding multivendor networking requirements — while also providing a clear migration path to tomorrow's emerging multimedia applications such as voice and video to the desktop.

Ungermann-Bass also offers fully integrated bridge/router modules for high-speed campus backbones, value-priced remote office connectivity and WAN backbones for use in the world's largest, most advanced networks. All integrated as a total solution and managed by our industry leading NetDirector® LAN management system.

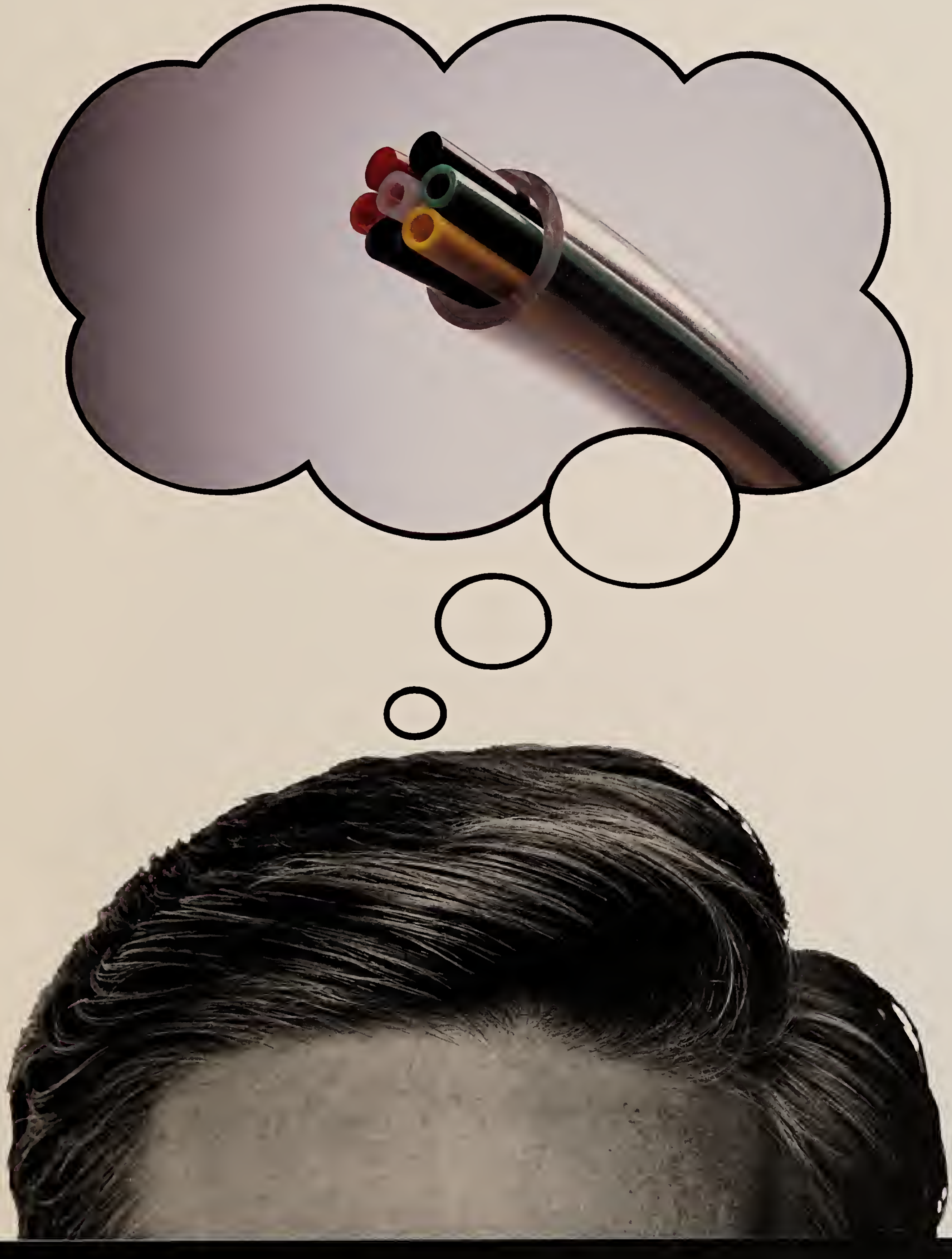
To receive a free copy of our technical paper "Internetworking with Bridges and Routers," call **1-800-777-4LAN.**

Ungermann-Bass
Your global network integration partner.

Ungermann-Bass, Access/One and NetDirector are registered trademarks of Ungermann-Bass, Inc. © 1992 Ungermann-Bass, Inc.

Circle Reader Service #109

Before *Ethernet switching*, increasing the capacity of your existing network to an *incredible* 70 Mbit/s was only a pipe dream.



Without the wonders of *Parallel Networking,* there simply was no hope for a *practical* solution to Ethernet's inability to carry more than one conversation at a time.

If Ethernet congestion has you and your network tied in knots, rest assured you're not alone.

Not by a long shot.

Take the case of George Gilbert (not his real name)—a typical network manager in any Fortune 500 company across America.

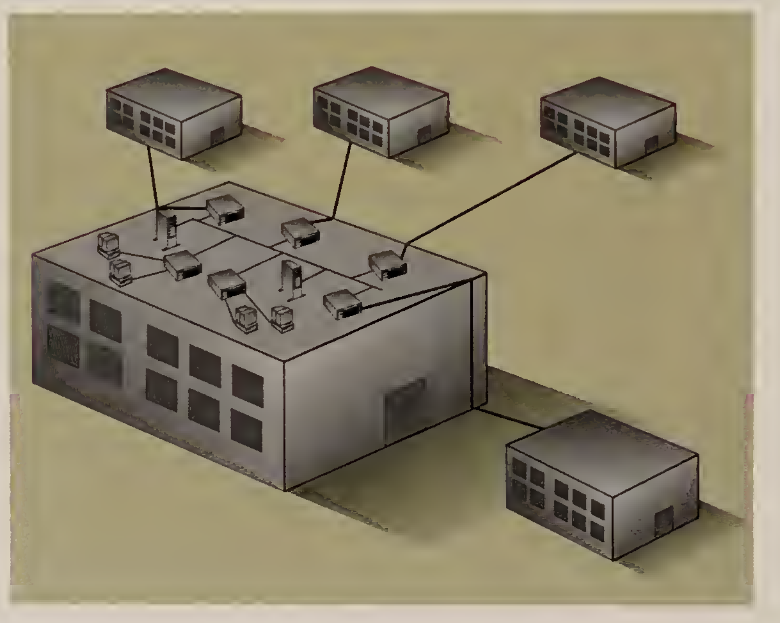
His network, like yours, continues to get slower and slower with each passing day.

That's because more and more users are being added to his network. Along with more powerful devices. And each user is accessing more network-intensive applications than anyone ever thought possible.

Plus George has the formidable task of networking seven different departments. In five separate buildings. With each floor using a variety of software on a combination of PCs, Macintoshes and workstations.

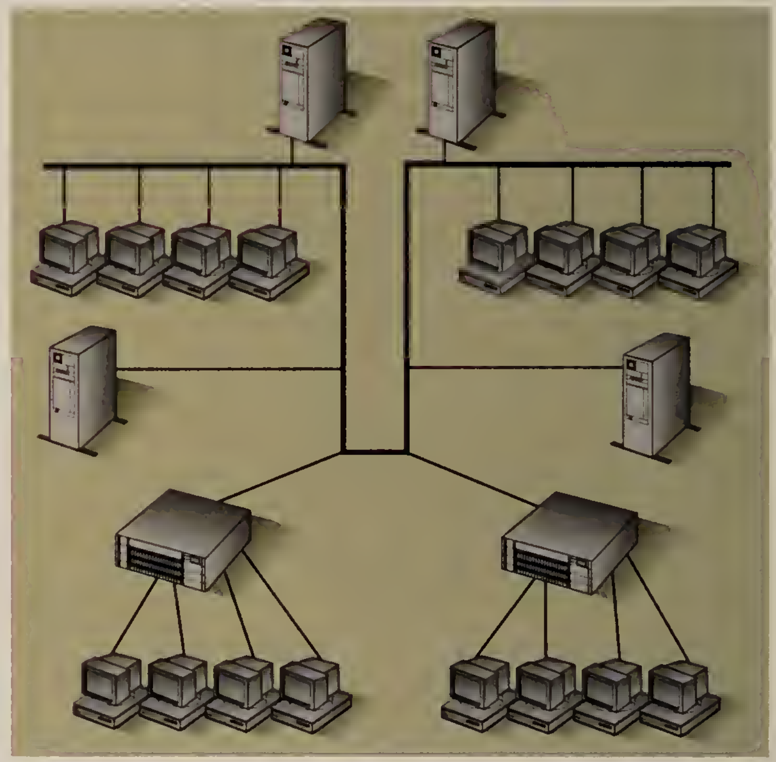
And to top it all off, he has to bring them all together on a 10 Mbit/s Ethernet network that just wasn't made for this level of traffic.

Needless to say, given this state of affairs, George Gilbert has put his vacation plans on hold indefinitely.



Workgroups are really suffering.

Nowhere is the strain of an overburdened network more evident than within one of George's engineering workgroups.



Just six months ago, these users were disappointed that it took five minutes to download a simple CAD drawing.

Now it takes *ten minutes,* and the engineers are *really* pulling their hair out.

To solve the network bottleneck, George has considered adding a bridge or router and more servers.

Unfortunately, this would only further complicate his network and add more latency. He'd also have to dish out thousands of dollars for new equipment and additional copies of all the software they run.

Big problems on the backbone.

It's the same dismal story along George's network backbone.

The system was originally intended for simple transmissions like E-mail. But now it's being used for high-volume data transfers between floors and across buildings.

Day in and day out, George is hearing how sluggish things are. And now he's even seeing NFS timeouts that

are keeping users in the dark for hours.

Again, he considered adding bridges and routers. But they're designed for jobs like protocol isolation, wide area connectivity and connecting dissimilar networks. They are *not* designed to boost network throughput.

In fact, due to increased latency, bridges and routers can actually slow transmission speed by as much as 50%.

That's really no solution at all!

Next, George considered adding FDDI throughout the entire campus.

Until he considered the tremendous costs of FDDI and the incredible headaches of completely reconfiguring his network. And after all that work, his users would *still* be sharing a fixed bandwidth. So eventually the same problems would resurface.

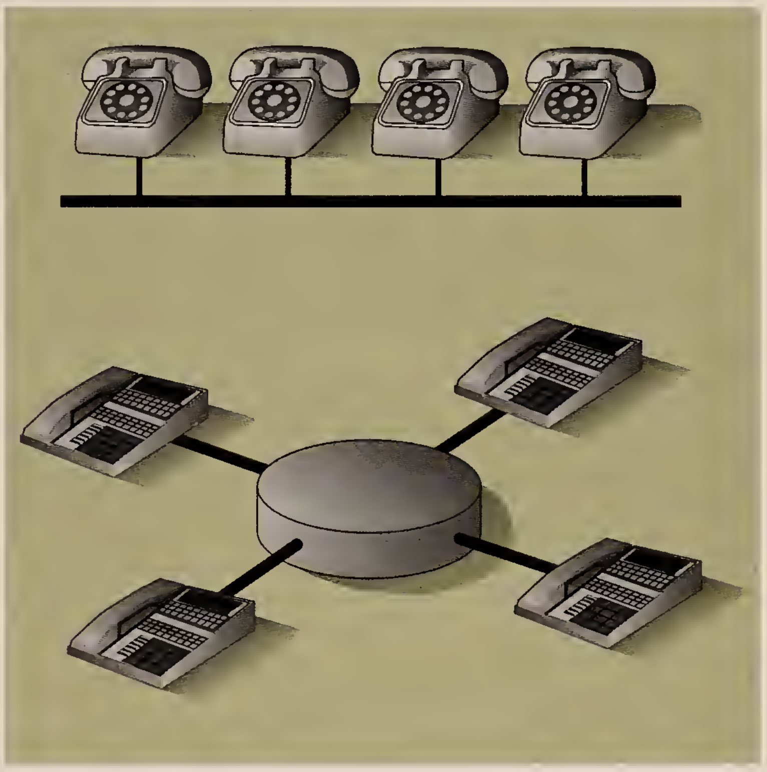
No wonder George can't sleep at night.

What's really needed is a new, complete solution that isn't riddled with compromises.

All these problems have George thinking.

Thinking *beyond* FDDI and bridges and routers.

And just like you, he's thinking how great it would be to find a solution that dramatically reduces response times. A solution that protects his investment and extends the life of his existing network.



While party lines allowed only one *conversation at a time, today's PBXs simplify and speed calling by providing multiple, simultaneous conversations.*

A simple, affordable solution that overcomes the traditional one-conversation-at-a-time limit of Ethernet. One that meets today's needs and provides a path for the future.

After all, if they revolutionized *telephone* conversations with the PBX, why can't they do the same for Ethernet conversations?

For George, a solution like *that* would be a dream come true!

You're not dreaming! You *can* actually boost Ethernet performance 600% or more with the amazing EtherSwitch® from Kalpana.

Fortunately, George came across an extraordinarily safe and smart solution that allows Ethernet to carry multiple conversations.

It's called the EtherSwitch. And it immediately accelerates the throughput of his existing Ethernet network by as much as 600%.

All without the costs and complexities of FDDI. And without reconfiguring the basic layout of his network.

Needless to say, the EtherSwitch is making George Gilbert a big man on campus. A real hero.

From Kalpana, the inventor of Ethernet switching technology, comes Parallel Networking and the incredible performance advantages it offers.

And best of all, it can do the same for you! Right now. Here's how.

The secret to the EtherSwitch is time-tested switching technology. It allows for parallel transmissions — on a per-packet basis — to immediately relieve Ethernet congestion.

Think of the EtherSwitch as a PBX for your network.

You see, instead of sending single packets one after another, the EtherSwitch works like a telephone PBX to send multiple packets simultaneously.

Through *Parallel Networking*, George instantly and affordably eliminates peak loads and gives each and every one of his users guaranteed bandwidth. So suddenly his overburdened 10 Mbit/s network became a 70 Mbit/s powerhouse!

And to his users, the only difference is higher network availability. Because the network still looks and functions in exactly the same way.

It's just much faster.

What a simple solution!

Incredibly, the EtherSwitch is plug 'n go.

There's no software to install and it's protocol independent. Not to mention self-learning — which means the EtherSwitch automatically recognizes all the different equipment on your network.

So now, wherever George sees a slowdown, he simply adds an EtherSwitch and his problems are solved.

It even works with his bridges, hubs and routers.

Nothing could be easier or more effective.

There's a full EtherSwitch family to choose from.

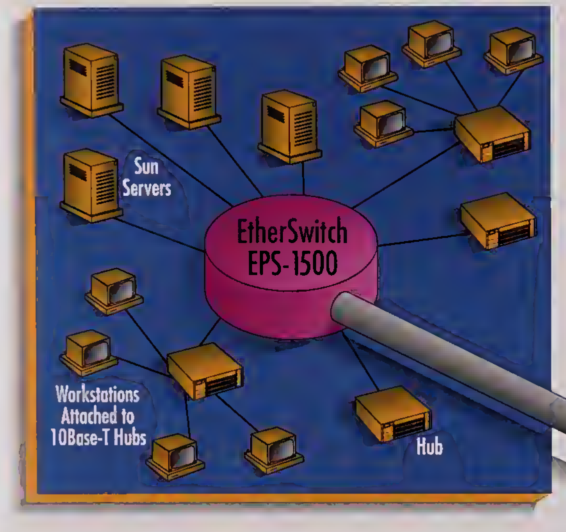
For every application, there's an EtherSwitch solution.

The options include pre-configured solutions from 2 to 15 ports, with more versions to come soon.

But no matter which EtherSwitch you choose, one fact remains certain: *Parallel Networking* translates into incredible and immediate performance advantages.

All at a price that you may find hard to believe!

George added EtherSwitches in these key areas, with plans to add more units soon.

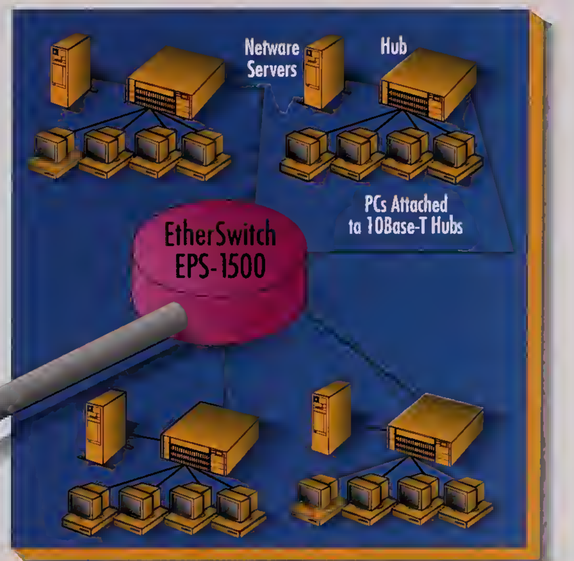


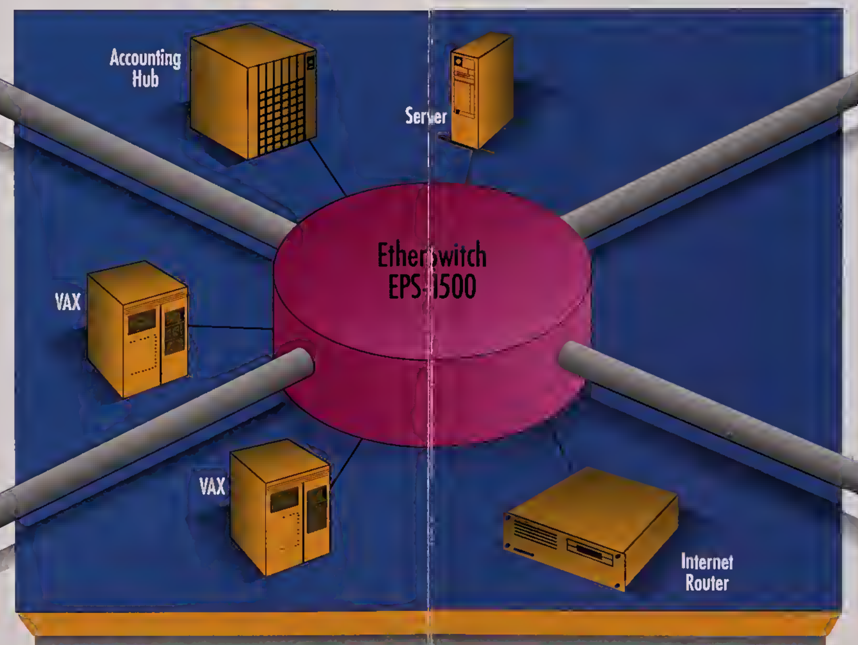
Engineering Department

Nowhere was the EtherSwitch more appreciated than among the engineering workgroup, where 3D models can now be developed 25 minutes faster.

Administration Department

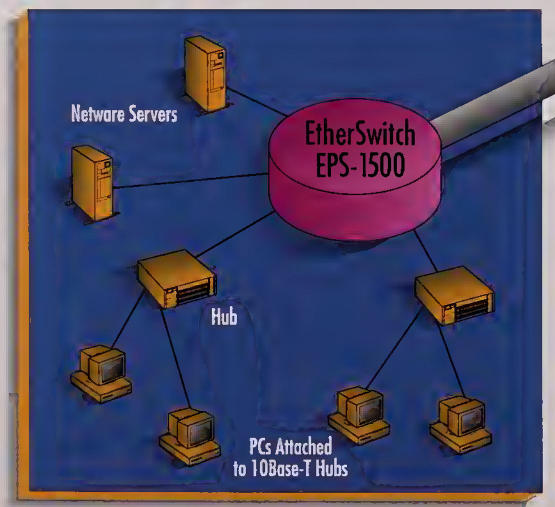
By interconnecting 10Base-T hubs with an EtherSwitch, the people in Human Resources can call up personnel files in 4 seconds instead of 2 minutes.





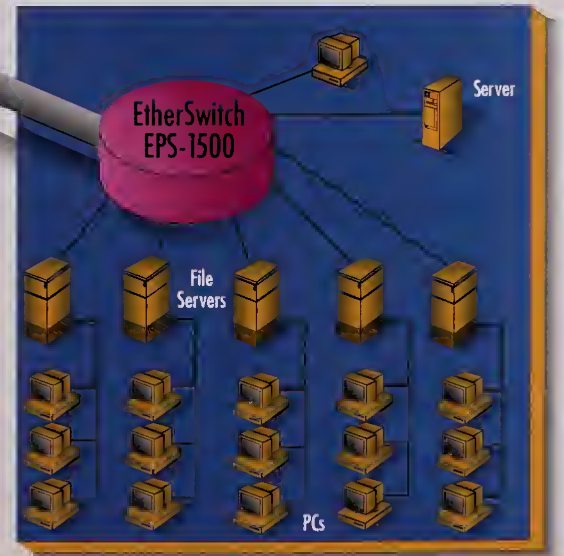
Marketing Department

When used to front-end file servers, the EtherSwitch reduced the time it takes to turn out the company newsletter by 75%.



Sales & Telemarketing Department

For the folks updating direct mail lists, an EtherSwitch cut file access times from 45 seconds to 3 seconds.



What is Ethernet switching?

- *Protocol-independent technology that switches packets on-the-fly between Ethernets — all operating in parallel.*
- *Properties exhibited:*
  –low latency (10's of microseconds)
  –massively parallel switching
  –scalable, busless architecture
  –does not use store/forward technology

The EtherSwitch EPS-1500

Each of the EtherSwitches in George's network offers the same incredible features.

Like 100% filtering and forwarding. On-the-fly packet switching. And low latency. Plus compatibility with TCP/IP, DECnet, LAT, XNS, AppleTalk, NetWare and other 802.3 protocols. And each can be managed through the Simple Network Management Protocol (SNMP).

From Kalpana — the first name in Ethernet switching.

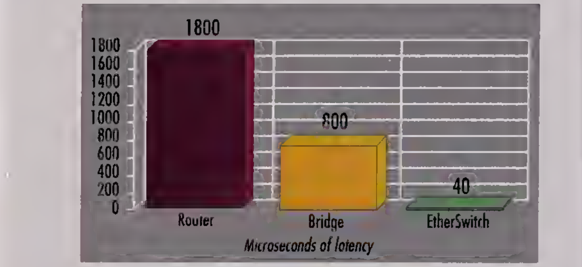
When George chose Kalpana, he chose the world leader in *Parallel Networking*.

As the inventor of Ethernet switching technology, Kalpana has built a reputation for quality, responsiveness and growth.

Through a customer-driven approach to design, service and support, Kalpana delivers proven, reliable solutions to the ever-increasing problem of network throughput.

As you can imagine, George is resting a lot easier these nights.

The Lower The Latency The Better!
(Latency = time measured from packet arrival to packet exit)



When you compare our unique Ethernet switching technology with other solutions, there really is no comparison.

The results of adding the EtherSwitch?

Forty-eight hours have passed since George installed five EtherSwitches — and the results are amazing.

CAD drawings, which once took ten minutes to download, today take less than a minute. And building-to-building conversations are happening instantly.

But read on. Because you'll see why performance *alone* is not the only reason George chose the EtherSwitch.

Answering the need for a new solution.

When did you first know it was time for an EtherSwitch?
When people started staring at me in the lunchroom. Over the last year our network response times just kept getting worse and worse. We kept adding people and devices, and pretty soon our peak loads were around 60% and our average network utilization topped 15%.

Was it hard to install your EtherSwitches?
Heck no. I just plug them in and let them do their magic. There's no messy software or thick manuals to memorize. They're even protocol transparent and they automatically learn the new location of devices.

How do EtherSwitches differ from bridges or routers?
Bridges and routers use store-and-forward technology that's fine for some things, but not throughput enhancement. The EtherSwitch, on the other hand, allows simultaneous on-the-fly conversations that cut latency to about 40 microseconds. Bridges are more like 800 microseconds and routers 1800. That's quite a difference.

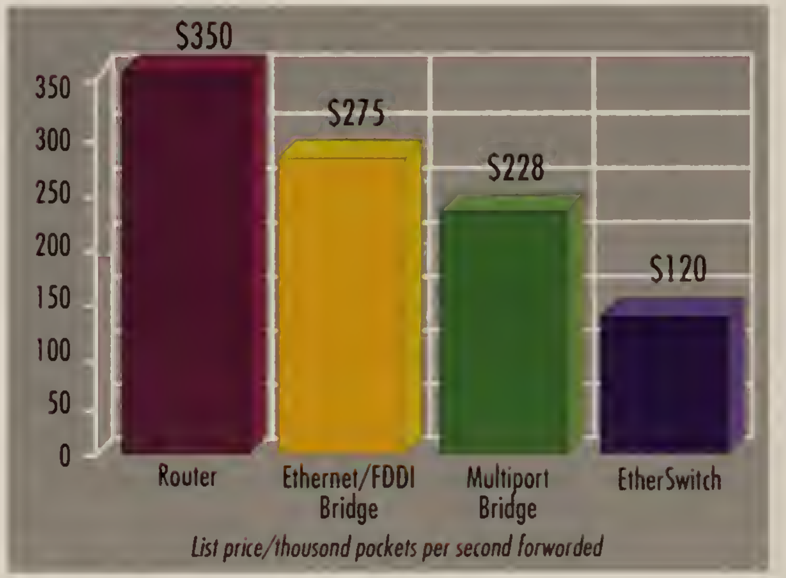
Can you use an EtherSwitch with all your existing devices?
My investment is safe with the EtherSwitch. It works with all my existing equipment and is perfect for interconnecting 10Base-T hubs, front-ending file servers or attaching routers.

When did your network users see a benefit?
The second I plugged the first EtherSwitch in. Because we had so much congestion, users noticed faster response times and more available bandwidth immediately. Suddenly file transfers and program loads were taking a fraction of the time they used to take. And once again, people were smiling at me in the lunchroom.

The EtherSwitch. Big performance without the big price tag.

Costing much less than FDDI or bridges and routers, the EtherSwitch makes economic sense.

Especially when you see how it lets users work so much faster and more efficiently than any other solution.



Today and in the future, Kalpana's EtherSwitch is clearly the most cost-efficient solution.

By saving money *and* boosting performance, George has quickly become the talk of the company. And a favorite among top management.

But he's not going to let the success go to his head.

In fact, right now, this very minute, George Gilbert is sketching out where he's going to add his next three EtherSwitches.

Naturally, he's on the beach, in the islands, using his finger to sketch this in the sand.

Because after all the heat George has taken, he certainly deserves his place in the sun.

Join George and bask in the glory of fame and fortune.

You too can have an incredible transformation.

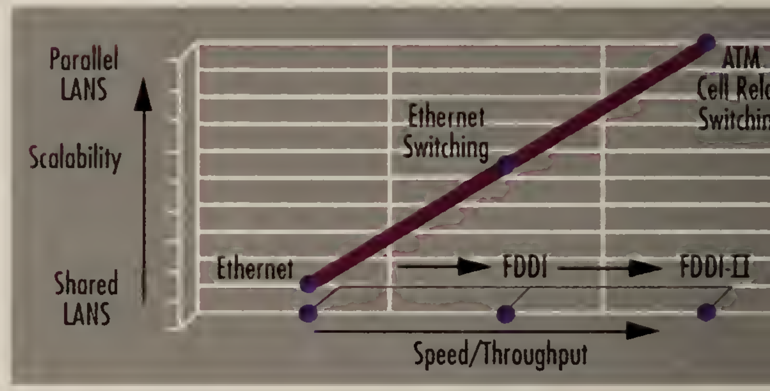
Let the EtherSwitch turn your network into a powerful 70 Mbit/s Ethernet throughput machine.

To see how the EtherSwitch can do wonders for your network throughput, call Kalpana now for an evaluation unit at: **800-488-0775.** We're so sure the EtherSwitch will deliver in your network, we even have a Try 'n Buy program.

Or, if you want more information on Ethernet switching, call for our animated presentation disk.

You can even fax Kalpana your current network configuration at 408-988-1361 (be sure to point out where congestion is occurring)—and within 24 hours we'll respond with a customized, affordable solution that will turn your sluggish Ethernet network into a throughput powerhouse.

So call now, because great things are waiting to happen!



Wherever networking takes you, the EtherSwitch will serve your needs.

Kalpana

The Parallel Networking Company
3100 Patrick Henry Drive
Santa Clara, CA 95054
800-488-0775

EtherSwitch is a registered trademark of Kalpana Inc. Product names are trademarks or registered trademarks of their respective companies.

INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

According to a recent
eport by The Yankee
Group, the switching
hub will constitute a
major portion of the
overall hub market.
Because of the
switching hub's ability
o extend a LAN's
virtual bandwidth, this
growth will come at the
expense of FDDI.

Link Notes

Optical Data Systems, nc. (ODS) has announced upport for out-of-band Serial Line IP (SLIP) management on all its token-ring, Fiber Distributed Data Interface and Ethernet intelligent hubs and bridge/routers. The new interface will enable ODS devices to implement out-of-band Simple Network Management Protocol over SLIP to provide network management capabilities even when the net s malfunctioning. SLIP is an nternet Protocol used to run Transmission Control Protocol/IP over serial lines.

Using an out-of-band topology with SLIP management, an ODS bridge/router or hub can now be managed from an SNMP management station while other net traffic is at a standstill. The SLIP interface, which is avalable now on all ODS products, costs $100 per port.

Artel Communications Corp. announced that its Galactica switching hub set an industry-record Ethernet forwarding rate during recent testing at Harvard University's Internetworking Laboratories. Galactica's forwarding rate for 64-byte packets was 84,306 packet/sec across six simultaneous data paths. ◘

New module lowers cost of Fibermux LAN hub ports

The 16-port module also increases hub capacity.

By Maureen Molloy
Senior Writer

CHATSWORTH, Calif. — Fibermux Corp. last week announced a 16-port 10Base-T Ethernet module for its intelligent hubs that reduces their per-port cost to less than $125.

Using new semiconductor technology from National Semiconductor Corp. (NatSemi), the $1,995 CC6613EZ/16 module increases the number of workstations that can be supported by a single hub. For example, Fibermux's Crossbow*Plus* (FX6700) 14-slot hub can now accommodate up to 224 workstations when loaded with the new modules, up from the previous 140.

Also, previous Fibermux 10Base-T modules supported only 10 ports and cost $1,375, or $138 per port.

"For companies with growing networks, the issue with hubs is not just cost per port but also getting the most connectivity out of limited space in the wiring closet," said Steve Storozum, Crossbow product manager at Fibermux, based here.

The CC6613EZ/16 uses NatSemi's Repeater Interface Controller (RIC) technology, a multiport Ethernet signal repeater. Fibermux uses the RIC chip in each of its hub modules rather than in a single repeater module for the entire hub. With this distributed repeater configuration, failure of any module affects only the workstations connected to that module and not all the workstations in the hub.

The CC6613EZ/16 is also equipped with a polarity detection and correction feature that can find a polarity reversal on the 10Base-T cable. The module compensates for the reversal so the network can continue to operate. The administrator is alerted to the problem via a front-panel LED or network management system.

The new module is available now.

For more information, call Fibermux at (818) 709-6000. ◘

NCR to offer global support for Cisco's bridge/routers

By Maureen Molloy
Senior Writer

MENLO PARK, Calif. — Cisco Systems, Inc. last week announced it has signed an agreement with NCR Corp.'s Customer Service Division wherein NCR will provide hardware service and support for Cisco's bridge/routers on a global basis.

The vendor also announced a new header compression feature on its bridge/routers that improves the efficiency of sending Transmission Control Protocol/Internet Protocol data across low-speed serial lines and X.25 networks.

The NCR agreement significantly strengthens Cisco's support offerings by providing its larger customers — many of whom have multinational operations — with single-source hardware service for their Cisco router-based internets.

By teaming with NCR, Cisco is addressing a key customer requirement, as many users lament the dearth of local support and service facilities provided by internetworking vendors ("Service a sore point with bridge/router customers," *NW,* June 1).

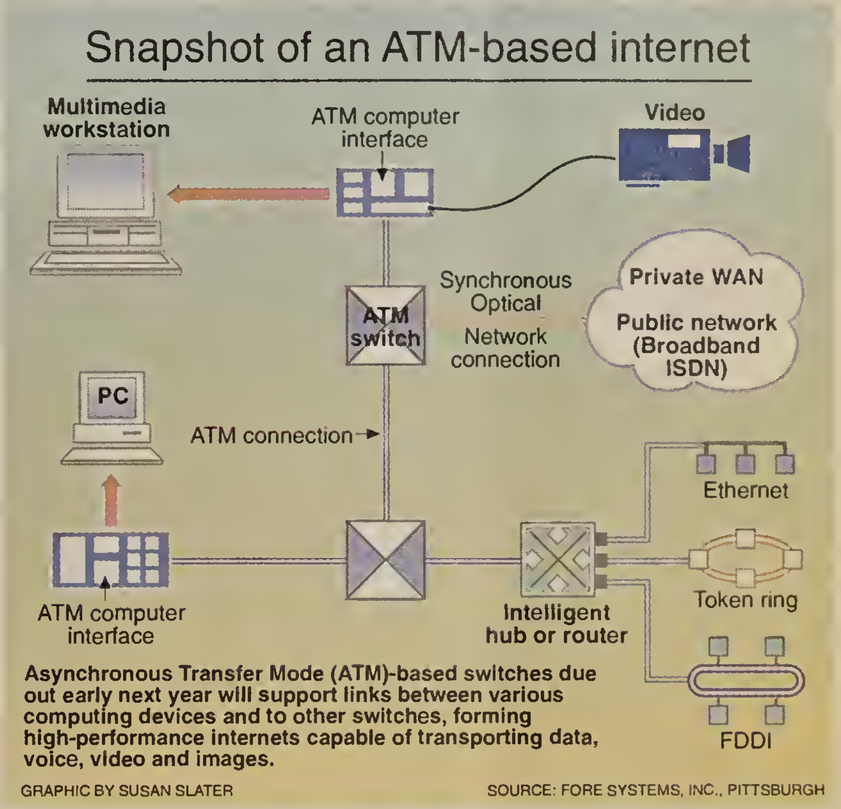
Under the terms of the agreement, which is effective immediately, NCR's 11,300 international field engineers, located at 1,100 service centers in 120 countries, can be deployed by Cisco's Technical Assistance Center to provide on-site hardware maintenance and replacement under a number of service contracts.

Depending on the contract options selected, the level of service can be as high as a four-hour response time, 24 hours a day, seven days a week in the U.S. and major international cities, and a four-hour response, eight hours a day, five days a week in most international locations.

With its new TCP/IP feature,

(continued on page 34)

Snapshot of an ATM-based internet



Asynchronous Transfer Mode (ATM)-based switches due out early next year will support links between various computing devices and to other switches, forming high-performance internets capable of transporting data, voice, video and images.

GRAPHIC BY SUSAN SLATER

SOURCE: FORE SYSTEMS, INC., PITTSBURGH

ATM emerging as LAN hub alternative

Users are testing Fore Systems' high-powered ATM switches as replacement for intelligent hubs.

By Skip MacAskill
Staff Writer

PITTSBURGH — The move by major hub vendors to fine-tune their Asynchronous Transfer Mode (ATM) strategies may be an indication that intelligent hubs will soon be challenged by more powerful ATM switches.

With vendors such as Adaptive Corp. and Fore Systems, Inc. preparing to ship ATM switches this fall, it appears that today's intelligent hub may very well evolve into tomorrow's ATM switch.

"Your typical ATM LAN will be centered around one or more ATM switches, which are more powerful than your typical intelligent hub in terms of processing power devoted to both net management and the signaling protocols," said Eric Cooper, president of Fore Systems, based here.

Cooper's company last month completed five trials of ATM local-area networks, testing its ATM switches and buses under a wide range of LAN applications. Final analysis of those results has not been completed, but preliminary data indicates the gear performed well.

"We wanted to discover things that a normal laboratory environment would not show us," Cooper said. "We let our beta sites blaze their own trail. Some were experimenting with [high-definition televison] over ATM, while others were doing supercomputer visualization and network shared memory."

One location was the Naval Research Laboratory in Washington, D.C., which served as a test site for Fore Systems' ASX-100 ATM Switches.

The ASX-100 line supports 16 ATM connections and has a switching capacity of 2.5G bit/sec. Workstations equipped with one of Fore Systems' ATM adapter boards — the TCA-100 Turbochannel or SBA-100 SBus — are attached to an ASX-100 switch over dedicated fiber-optic links.

To interconnect a series of ATM LANs, multiple switches can be linked together.

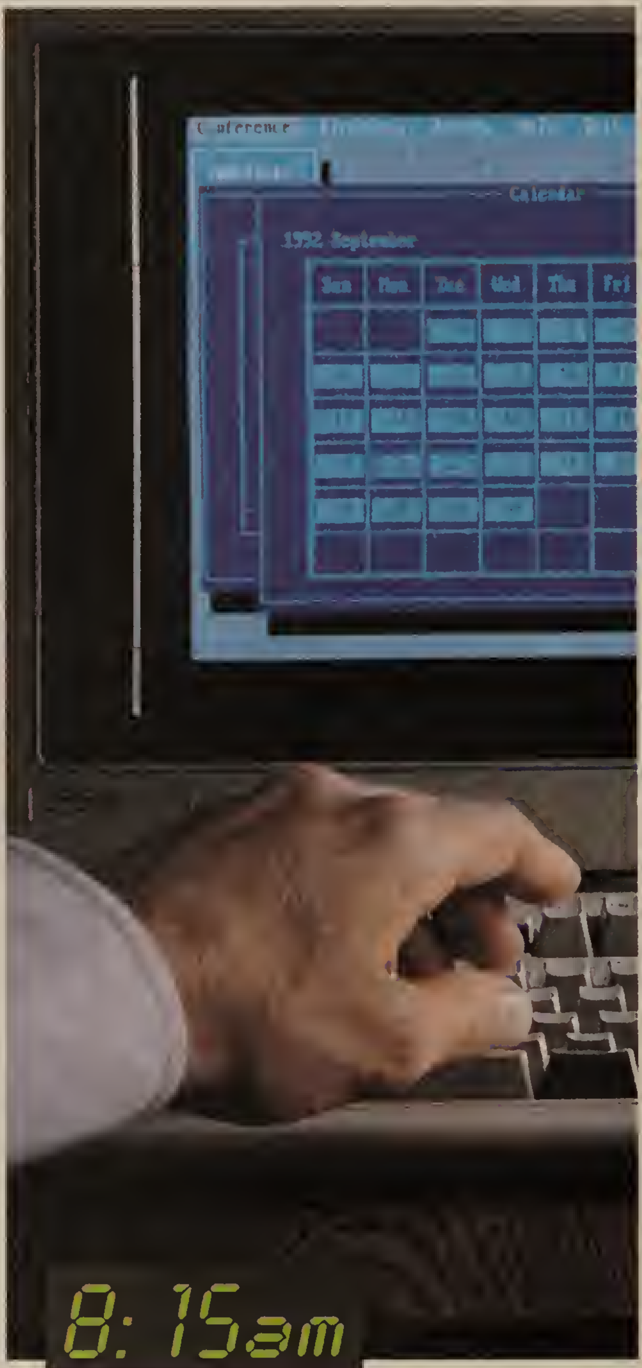
"Overall, the key thing that distinguishes a switch from a hub is that the total bandwidth is huge — usually the sum of all input ports," Cooper explained. "With an ATM switch, any input port can go to any output port without interfering with any other similar connection. In bus-based hubs, if enough input sources get on the bus, you saturate it at some point. A switch isn't really an ATM switch unless it solves that saturation problem."

The Navy trial involved setting

(continued on page 34)

Videoconferencing at a moment's notice.

You have a great idea.



You set your schedule.

You present your idea.

With SP Telecom's Media Express network, your next great idea is only minutes away from a videoconference. Media Express videoconferencing is that easy.

Media Express also gives you control. Instead of going back and forth through an operator, with our one-of-a-kind Automated Scheduler, you simply choose the parameters for your conference through a PC interface.

Choose a point-to-point conference. Or select a multipoint conference through our integrated network of bridges. With contiguous bandwidth on-demand, choose transmission speeds at the rate of 128, 384, 768 KBits or even 1.544 MBits.

Plus, at a moment's notice, you can choose to extend videoconferences or end them early, paying only for the minutes you use. It's that flexible and simple.

And when you choose Media Express, we will coordinate set up and maintenance with your videoconferencing equipment vendor. So, you will only need to concentrate on videoconferencing.

Call today and ask how Media Express can give your company a competitive edge with a true on-demand videoconferencing network. It's ready when you are.

1-800-229-7782.

60 Spear St., 7th Floor, San Francisco, CA 94105 ©1992. Patent Pending. Media Express is a service mark of SP Telecom.

SP TELECOM

Adding value
to your business
is our business

Circle Reader Service #107

GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

Worth Noting

VMX, Inc. recently received a patent for a unique feature of its voice processing systems that automatically transfers callers to a live assistant if the called party does not answer. The user can then speak to the assistant or transfer to the called party's voice mail box.

Regulatory Update

MCI Communications Corp. took the **Federal Communications Commission** to court last week over a decision the agency made in May about AT&T providing an 800-type access feature in its Software-Defined Network offering.

Although the FCC ruled that the SDN feature, dubbed Network Remote Access Option III-Express, violated its ban on bundling 800 and other services, the agency did not award MCI the damages it was seeking. MCI claims it lost a significant amount of business due to AT&T's sales of the SDN feature.

The feature lets users dial in to a predetermined on-network SDN location using an 800 number from an off-network site. The calls are billed at SDN rates, which MCI says may be substantially less expensive than typical 800 calls.

"MCI seeks review of the [FCC] order on the grounds that it is arbitrary, an abuse of discretion [and] violative of the Communications Act [of 1934]," the carrier told the court. The FCC's ban on bundling 800 and other services will expire when 800 portability becomes available, which is scheduled for March 1993.

Lynx puts global info at net managers' fingertips

Dial-up database offers wide range of services.

By Bob Wallace
Senior Editor

LITTLE FALLS, N.J. — Lynx Technologies, Inc., a tariff analysis and network design firm here, has developed a service that enables users to dial up the firm's global telecommunications services and tariff information database.

The service, dubbed Lynx Global Telecom Database, is the electronic equivalent of the company's 10-volume, 700-page compendium of information on carriers, services, rates, regulations and policies.

The database will help net managers that are planning to build global networks, expand existing networks or optimize international nets for cost and performance.

The Global Telecom Database has five primary segments:

- Demographic and economic indicators, which include updated figures on population, government type, weekly currency exchange rates, trade flows and the number of households.
- Carrier information, including names, addresses and numbers for administrative offices as well as key carrier executives.
- Telecommunications traffic history and statistics, including the total number of minutes of both national and international traffic that each carrier supports, as well as the number of private leased circuits and telex lines they have.

Other figures include each carrier's investment in telecommunications facilities and the size of each carrier's telecommunications staff.

- Telecommunications tariffs, including tracking rates for international and domestic private lines, International Direct Distance Dialing, domestic telephone, public data network, facsimile and telex services offered by 367 carriers.

Lynx is adding videoconferencing, very small aperture terminal, 800 and virtual voice network services to its Global Telecom Database.

- Service descriptions, including data on the availability of each network service by carrier, as well as the availability of offerings such as operator services.

The Global Telecom Database

(continued on page 26)

WilTel lands $11 million mgmt. contract with PECo

By Bob Wallace
Senior Editor

PHILADELPHIA — Philadelphia Electric Co. (PECo) has awarded WilTel a two-year, $11 million contract to manage telecommunications and data equipment at 150 PECo sites in seven counties throughout Pennsylvania and Maryland.

The decision to use WilTel to maintain equipment and handle cabling at the sites will free PECo from dealing with nine different equipment service arrangements.

The utility chose WilTel over AT&T, Bell Atlanticom Systems, Inc., IBM and Rolm Co. because the company best addressed PECo's needs at the lowest price, according to James Rhein, a buyer with PECo.

"We assigned each vendor several common equipment management problems to see how they would handle each predicament," Rhein said. "WilTel scored the highest of the group in this exercise."

One step further

PECo wants WilTel to do more than just control costs: The utility wants the vendor to reduce costs and improve service. PECo declined to say how far it has asked the vendor to reduce costs.

"We realized it would make more sense to have one vendor manage our facilities than to have that responsibility spread out among a number of vendors," Rhein said. "This is even more important in light of our recent decision to decentralize."

Under the arrangement, Wil-

(continued on page 26)

FTS 2000 evolution through enhancements

Original services	Enhancements	Date added
Switched Services (voice and low-speed data)	Enhanced 800 routing	July 30, 1990
	Improved 800 management reports	July 26, 1991
	Authorization codes	Dec. 9, 1991
Packet Switched Data (including E-mail)	800 access to packet servers	Nov. 30, 1990
	Added protocol conversion	Feb. 1, 1991
	Enhanced FTS 2000 Mail	Feb. 28, 1991
Dedicated Transmission (high-speed data lines up to T-1)	Added T-3 service	March 31, 1992
Switched Digital Integrated Service (voice and data on single line)	Added ability to bundle dedicated circuits with SDIS on single Primary Rate Interface line	April 28, 1992

The Federal Telecommunications System 2000 contract also includes switched data and video services, but there have been no enhancements in these areas.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: *NETWORK WORLD*

FTS 2000 contract charges under fire

Study says gov't overcharged under FTS 2000; carriers file lawsuit after T-3 service is added.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — WilTel released a study here last week that claims the federal government is routinely overcharged between 30% and 400% for T-3 service compared to commercial users.

The study bolsters claims WilTel made in a lawsuit challenging the addition of T-3 service to the government's Federal Telecommunications System (FTS) 2000 contract.

In addition to alleging overcharges, WilTel said that T-3 services are outside the scope of the original FTS 2000 contract and, therefore, should be open to competitive bids, rather than automatically awarded to AT&T and Sprint Corp., the two FTS 2000 carriers. AT&T categorized the addition of T-3 service as a service enhancement (see graphic, this page).

MCI Communications Corp. has joined WilTel in the lawsuit, which is expected to be decided by the end of this month.

The study, which was funded by WilTel but written by Michael Hills, president of HTL Telemanagement, Ltd., a Burtonsville, Md., consulting firm, is the latest in a series of accusations that the government is being overcharged for service under the FTS 2000 contract. MCI has repeatedly claimed that its rates for government services are about 30% less than those under FTS 2000.

Last fall, the General Accounting Office issued a study corroborating MCI's charges.

In the study on T-3 rates, Hills compared tariffed and contract rates from AT&T and MCI against prices AT&T charges government users under the FTS 2000 contract. AT&T added T-3 service to the FTS 2000 contract in May, immediately touching off challenges by rival carriers WilTel and MCI.

Hills calculated costs for both T-3 transport, which is charged on a per-mile basis, and T-3 access from the local carriers. He projected that government demand is high enough to qualify for volume discounts built into the carriers' tariffs, and those discounted rates were used when he made the FTS 2000 comparison.

As an example, Hills calculated costs for a three-node T-3 network linking Idaho Falls, Idaho; Las Vegas; and Rockville, Md. Based on rates for a one-month

(continued on page 26)

A Lot Of Our Customers Choose *NetBlazer*™ Dial-Up Networking For Some Very Remote Reasons.

NetBlazer. The Most Affordable Way To Expand Your Network.

Connecting remote LANs and computers to your enterprise network has been complicated and cost-prohibitive for most companies. Until Telebit invented Dial-Up Networking.

Many routers provide leased-line capabilities. But unlike others, the NetBlazer family of communications servers also offers the versatility of using telephone dial-up or ISDN lines to create extensive, virtual wide area networks through the use of the Public Switched Telephone Network. Which gives you the flexibility to network from any location where there's a telephone, without paying the high cost of leased lines.

The NetBlazers' LAN-based communications capabilities make them powerful tools for applications including remote telecommuting, small office connectivity, remote network management, and leased-line backup.

Call **1-800-TELEBIT** for a free NetBlazer Application Guide, and see for yourself how far remote networking can take you.

TELEBIT®
First in Dial-Up Networking.

Call us today for information on the NetBlazer seminar coming to a location near you.

© 1992 Telebit Corp. (408) 734-4333. (800) 835-3248. FAX: (408) 734-3333. 1315 Chesapeake Terrace, Sunnyvale, CA 94089-1100. Telebit is a registered trademark and NetBlazer is a trademark of Telebit Corp.

Circle Reader Service #108

ENTERPRISE APPLICATIONS

CLIENT/SERVER AND ENABLING SOFTWARE: DISTRIBUTED DATABASE, MESSAGING, GROUPWARE AND IMAGING

Worth Noting

> "Prioritize the hardware, data and applications you want to manage because you can't optimize management of everything. Try to do the best with your top priorities, and the rest will swim or drown."
>
> **Shaku Atre**
> President
> Atre Consultants, Inc.
> Rye, N.Y.

Store & Forward

Net Manage, Inc. recently began shipping software that allows developers to use Transmission Control Protocol/Internet Protocol services for communicating between Microsoft Corp.'s Windows NT and other operating platforms.

The Chameleon 32 Developers Release is written to the Windows Socket application program interface and supports a variety of applications, such as file transfers and messaging, over TCP/IP. It costs $495 and includes all future updates to the product.

Blyth Software, Inc. recently announced an agreement that will enable users of its Omnis 7 development software to access nonrelational data.

Blyth will interface Omnis 7 to Information Builders, Inc.'s Enterprise Data Access (EDA)/SQL software. EDA/SQL is client/server software that lets SQL-based applications access more than 50 databases and file types.

Omnis 7 lets developers generate application code that runs on multiple operating platforms and accesses multiple back-end databases.

Critical application development issues

Top 10 issues

1. Rapidly responding to user requests.
2. Increasing developer productivity.
3. Identifying and developing strategic information systems (IS).
4. Developing an information architecture.
5. Maintaining existing applications while migrating to new ones.
6. Obtaining senior executives' approval for new projects.
7. Implementing a total quality management program.
8. Achieving support for cross-functional applications.
9. Implementing metrics for application development.
10. Managing end-user application development.

Based on a survey of 162 North American systems development executives with an average IS budget of $55.8 million.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: CSC/INDEX, INC., CAMBRIDGE, MASS.

UniSQL integrates object and relational technologies

Database prepped to handle complex data types.

By Wayne Eckerson
Senior Editor

AUSTIN, Texas — While database vendors square off in relational and object camps, start-up UniSQL, Inc. has announced a database management system that combines the best of relational and object-oriented technologies.

The UniSQL/X Database Management System integrates object-oriented modeling and multimedia data in an ANSI-compliant SQL query environment.

UniSQL, based here, also announced tools that help developers build object-oriented applications.

The new database structure, which currently runs on IBM RISC System/6000 workstations, was designed by Won Kim, who founded UniSQL two years ago. Previously, Kim headed the Object-Oriented and Distributed Systems Laboratory at the Microelectronics and Computer Technology Corp. and served as a research scientist at IBM's Almaden Research Center, where he focused on database technology.

The UniSQL/X database contains features common to relational database management systems — such as query optimization, automatic concurrency control, auto restart and recovery — that enable those systems to support mission-critical applications in a reliable manner.

But the new database also was optimized to support information stored as objects, which are data and software code that define fundamental components of business operations.

As such, UniSQL/X supports user-defined data types, complex nested data, inheritance and multimedia data.

"What we have done is create a brand new database structure from the ground up that modifies everything from the physical disk structure and transaction management to query optimization," said Albert D'Andrea, UniSQL's marketing manager. "We take everything that a relational database management system does and have extended that to capture the full object-oriented model, as well."

Higher throughput

D'Andrea said that because the UniSQL/X database is based on objects and object-oriented methods, it offers higher throughput than relational database management systems, which must perform multiple processor-intensive joins to handle complex queries.

This allows UniSQL/X to support sophisticated applications using complex data that conventional database systems have been unable to support. Such applications include geographic information systems and corporatewide network management systems that contain configuration, inventory and account information.

"Companies that will use our product are ones that are having trouble modeling their applications using strictly relational technology," D'Andrea said.

UniSQL/X is available now. A one-user license costs $3,995. The UniSQL/4GE Application Development Environment tools cost $2,590.

Mgmt. concerns slow distributed systems

Users have to develop their own tools to build and control distributed databases, applications.

By Wayne Eckerson
Senior Editor

Companies that are rushing to implement distributed computing systems are finding they have to reinvent many of the management procedures and tools they grew accustomed to in the centralized processing world they're now abandoning.

Many network and systems managers said vendors have failed to deliver robust products that will allow them to build and manage high-performance distributed computing environments. Consequently, most users are relying on homegrown tools and management procedures in order to build reliable, high-volume transaction processing or query systems on distributed platforms.

When asked whether vendors were offering enough capabilities to manage distributed computing environments, a systems manager at a large consulting firm who requested anonymity said, "That's easy. No."

A network manager at a major information services firm said, "Vendors offer a lot of promises in this area but few deliverables. I ignore 90% of what I hear."

Rich Finkelstein, president of Performance Computing, Inc., a market research and consulting firm in Chicago, paints a bleak picture of the future. "I haven't seen anyone come up with any good ideas yet to solve the problems [of building and managing distributed databases]. And there is no indication that there is any solution on the horizon."

When it comes to managing distributed environments, most users are struggling to implement procedures and develop programs to perform various management tasks, such as automated backup and recovery along with security and password management.

Motorola, Inc.'s Computer Group, for example, is downsizing from IBM mainframes to more than two dozen Unix serv-

(continued on page 30)

Officepower now supports mail-enabled applications

IRVINE, Calif. — ICL, Inc. has enhanced its Unix-based office system to support mail-enabled PC applications.

Users of ICL's Officepower office system can now send electronic messages and documents to other users directly from several popular Microsoft Corp. Windows-based applications.

The mail-enabled applications are WordPerfect Corp.'s WordPerfect for Windows, Microsoft's Word for Windows and Excel spreadsheet, Lotus Development Corp.'s Lotus 1-2-3 spreadsheet and Software Publishing Corp.'s Harvard Graphics for Windows.

Officepower is Unix server software that provides personal computer, terminal and Unix workstation users with X.400 electronic mail, database, spreadsheet, work flow, time management and document imaging capabilities. Officepower runs on ICL's own Unix processors as well as Sun Microsystems, Inc. SPARCstations and any Intel Corp. processor that supports The Santa Cruz Operation, Inc.'s Unix SCO software.

There are 300,000 users of Officepower worldwide and more than 100,000 in North America, according to ICL officials.

New feature

The new mail-enabled feature lets users select a message option from a pull-down menu within the Windows application. Then they can send part or all of the document on which they're working to another Officepower user across a corporate network. Users can also specify if they want to convert the document from one data type to another, such as

(continued on page 30)

FTS 2000 contract charges under fire

continued from page 23

period, Hills found FTS 2000 less expensive than commercial rates. But when the rates were calculated on multimonth terms, FTS 2000 rates were much higher.

A 36-month contract for T-3 service costs $320,878 under FTS 2000, compared to $284,681 (11.3% less) under AT&T tariffed rates, $264,277 (17.6% less) under MCI's commercially tariffed rates and $237,060 (26.1% less) under MCI's government rates. The price discrepancy increases even more with a 60-month contract. AT&T's commercial rates cost 23% less than FTS 2000, and both MCI's commercial and government rates are priced 29.9% less.

Hills' study indicated that the gap between FTS 2000 T-3 rates and those AT&T charges other customers under contract is even wider. AT&T filed its 14th contract deal in June, which allows customers committing to $100,000 in monthly charges to buy T-3 service at a significant discount.

Hills calculated that for T-3 circuits between 50 and 75 miles, the contract rate was 418% less than for FTS 2000. For circuits under 50 miles, the difference was 319%. For longer circuits, the gap was less. A 500-mile circuit, for example, costs 70% less under AT&T's contract deal than under FTS 2000.

Sprint has not added T-3 service to the FTS 2000 contract but is tracking the situation. A spokeswoman for AT&T claims there are flaws in the study, noting that the FTS 2000 prices are being renegotiated this year, which the study does not reflect. ◘

Lynx puts info at net managers' fingertips

continued from page 23

contains a practical application guide that includes detailed product descriptions of domestic and international services to help network managers rationalize widely divergent services.

The service descriptions section also includes definitions of basic switched, digital and public data network services. Among the services described are fast packet switching, frame relay, international value-added network services, videoconferencing and virtual private network offerings.

On-line essays by senior Lynx consultants are designed to help network managers cost-justify international networks, compare international hub locations, evaluate facilities management and decide whether they want to use options such as including international traffic under an AT&T Tariff 12 deal.

Users can access the Global Telecom Database using a Sprint Corp. SprintNet packet-switched connection or via 1,200, 2.4K, 4.8K or 9.6K bit/sec modems. No special personal computer software is required to access the database.

Occasional users pay a $3-per-minute access charge, with a minimum usage level of 30 minutes per month. Companies that use the service heavily pay $390 per month and a $1-per-minute access charge. There is a three-month minimum subscription period for both types of users. ◘

WilTel lands mgmt. contract with PECo

continued from page 23

Tel will perform moves, adds and changes for AT&T, Rolm, and Northern Telecom, Inc. switches at PECo sites and handle the utility's IBM data networking facilities, not the net itself. PECo is an IBM shop.

WilTel will conduct a full audit of all PECo's voice and data communications equipment and will provide a facilities management system to keep track of it all. The vendor will also be responsible for handling wire plants in the 150 PECo sites covered under the arrangement.

> WilTel will handle wire plants in the 150 PECo sites.
>
> ▲▲▲

WilTel will support token-ring LANs at each site that together support 3,000 to 4,000 IBM Personal System/2s. The LANs will be linked using PECo's microwave network, private fiber or AT&T T-1 pipes.

Rhein stressed that PECo will retain ownership of its voice and data communications equipment.

In addition, PECo will not transfer management of its six-node T-1 backbone network to WilTel, and AT&T will continue to be the utility's primary carrier for switched and dedicated services, according to Rhein. ◘

HOT NEW TELEPHONE SYSTEMS FROM MITEL

EASY DOES IT!

TO USE
Our attitude from Day One has been that telephone systems won't solve any of your problems if they're not easy – really easy – to use.

TO TRAIN
It only follows that an intuitive, plain language presentation is easier to learn. Less time training means more time doing.

TO INSTALL
Our new distributed, fiber-connected approach makes for a hassle-free (and less expensive) installation.

TO CHANGE
Grow by manageable increments, add new applications, exploit new opportunities. Our new product strategy is future-proof, organic and open.

Mitel has taken the full potential of business telecommunications and put it right where it belongs:

ON THE DESK
Our new SUPERSET™ 400 series matches the right telephone to the right job and is customizable down to an occupation-specific level.

IN THE WORKGROUP
The new modular design of the LIGHT systems allows you to configure components and applications that can be tailored for you to meet the varied needs of workgroups or departments.

THROUGHOUT YOUR ENTERPRISE
With much of the power distributed throughout your organization, there's no need to maintain that big box in the basement. Now you can focus on corporate issues such as network management or directories.

ACROSS THE NETWORKS
Our network interfaces let you take full advantage of the growing number of value-added options that can now be offered back through to the individual.

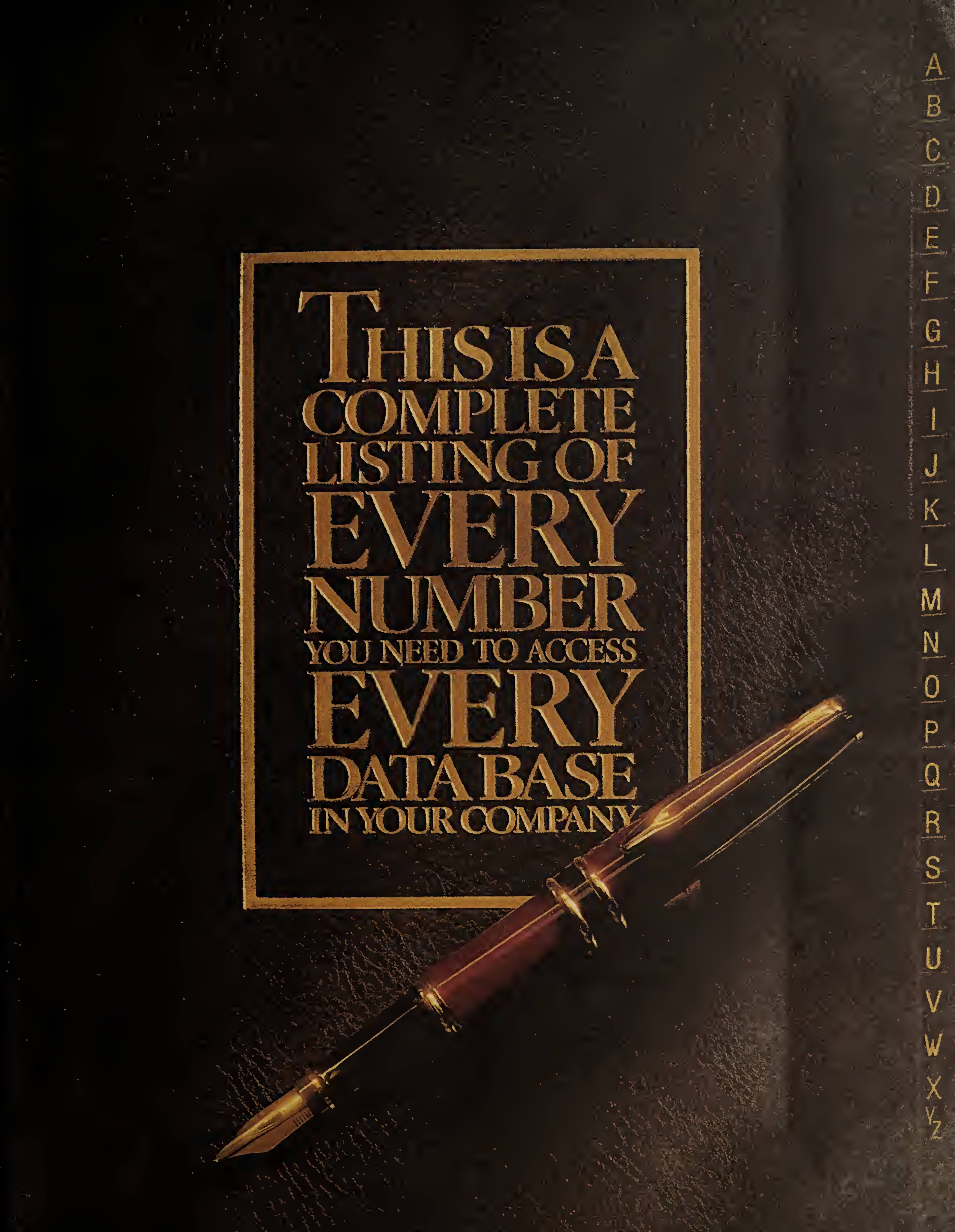
SUPERSET™ 400 SERIES
LIGHTWARE™
Call today. It's easy.
1-800-MITEL-SX

#1 OVERALL CUSTOMER SATISFACTION 1991*

MITEL™
The Right Attitude™

*DATAQUEST INC. (a Dun and Bradstreet Company), Score Report: Customer Satisfaction - PBX Systems; November 1991
M MITEL (design), ATTITUDE and bar (design), SUPERSET and LIGHTWARE are trademarks of Mitel Corporation.

Circle Reader Service #115


THIS IS A COMPLETE LISTING OF EVERY NUMBER YOU NEED TO ACCESS EVERY DATA BASE IN YOUR COMPANY
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y/Z

950-

Easier remote access to information helps improve produ

Now with just a computer and a modem (and, of course, the appropriate password), your mobile salespeople can provide on-the-spot answers that could mean the difference between "Let me get back to you," and "When would you like that delivered?"

Your customers can access their account balances, orders and delivery dates, from their own computer, with this national, toll-free 7-digit number.†

Suppliers, distributors and other business partners can obtain on-line information on parts availability, shipping status or inventory reports.

A single call from anywhere in the U.S. allows you access to multiple databases from your own personal menu.

And to gain extra security against unauthorized access, AT&T Bell Laboratories has incorporated an intelligent card security system that adds a randomly changing personal access code to password protection.

It's all part of the **InterSpan**℠ Data Communications Services family of high-quality, innovative data connectivity solutions designed to make it easier to link people, locations and information. We work with you to plan and design solutions to meet your exact business needs.

For more information, call your AT&T Account Executive or **1 800 247-1212, Ext. 623.**

© 1992 AT&T

1ATT

AT&T
InterSpanSM
Information
Access Service.

ivity, sales and customer service.

Service Highlights

* Toll-free, nationwide 7-digit number access.†
* Extra security via SecurID® "random" password generator card.
* International access to 112 networks in 105 countries.
* Billing rendered on a corporate, division or end-user basis.
* Detailed billing available via EDI.
* No extra cost for ubiquitous access at speeds up to 9600bps.
* No extra cost for DTE rates up to 19.2Kbps (MNP5® protocol).
* No hidden local dial access charges.
* No additional surcharges as in other X.25 networks.
* Helps eliminate separate modem banks.
* Supports multiple protocols (Async, SDLC, TCP/IP and X.25).

†An 800 number is available to serve remote areas where 7-digit access is not yet available. SecurID® is a registered trademark of Security Dynamics Technologies Incorporated. MNP5® is a registered trademark of Microcom.

AT&T
The right choice.

Mgmt. concerns slow distributed systems

continued from page 25

ers. To manage the new environment, the group is developing automated backup and restoral programs that can be activated across a network and directory services that automate the task of establishing and changing user accounts on multiple servers. It is also writing programs to gather configuration and performance data on Unix servers throughout the network.

"We are trying to recreate the same management disciplines we had in the IBM mainframe world in our distributed Unix environment," said Paul Watz, director of information technology at Motorola's Computer Group in Tempe, Ariz.

Motorola, like most users implementing distributed computing platforms, is building its own management tools while it continues to scout the marketplace for vendor-supplied tools.

Many users contacted by *Network World* were heartened by the recent announcement of client/server management tools from start-up firm EcoSystems Software, Inc. in Cupertino, Calif. ("New software targets client/server mgmt.," *NW,* July 6). Those tools promise to let users manage from a central console software, computers, databases and network components in a distributed server computing environment.

In the future, management products based on the Open Software Foundation, Inc.'s Distributed Management Environment and Unix International, Inc.'s Atlas architecture for Unix operating environments should ease the problems users face in managing distributed computing platforms, said Peter Kastner, analyst at Aberdeen Group, Inc., a Boston-based market research and consulting firm.

In the area of databases, vendors are beginning to offer capabilities to support truly distributed databases, such as two-phase commits, but users question whether these products really work in production environments.

To date, few users have succeeded in deploying distributed databases that support high-volume, mission-critical applications. Most are relying on their own staffs to build products that synchronize databases across a wide-area net, support high-levels of throughput and ensure adequate recovery if an outage occurs.

"Companies such as Oracle [Corp.] have been promoting distributed databases since 1987, but there are very few good examples to be found anywhere," Finkelstein said. "Usually, you'll find that companies have established multiple databases in a local environment or they are not supporting a high-volume query or transaction application."

One company that is further along than most in deploying distributed databases is Burlington Coat Factory Warehouse Corp. The company periodically uploads via satellite all point-of-sale transactions occurring at its 175 stores nationwide to a computer center in Lebanon, N.H.

The uploaded transactions then trigger updates to one or more Oracle databases running on more than a dozen computers from Sequent Computer Systems, Inc. and Sun Microsystems, Inc. The databases support such corporate functions as inventory and purchasing. The system supports about 50 to 100 updates per second.

To synchronize its databases and ensure data integrity, Burlington Coat built a queuing mechanism into its transaction monitor, which is an AT&T Computer Systems Tuxedo Transaction Manager. The queueing mechanism gives each transaction a unique identifier and logs it on disk before processing. If any database fails, Burlington Coat can reprocess a batch of transactions. ■

Officepower supports mail-enabled PC apps

continued from page 25

from WordPerfect to Word for Windows.

Officepower's X.400 mail system lets users on different platforms and networks exchange mail. Officepower runs on networks running Transmission Control Protocol/Internet Protocol, Open Systems Interconnection or Novell, Inc. protocols.

The new mail-enabled options reflect ICL's commitment to better integrate PCs with Officepower, said David Spiro, product manager for Officepower in Reston, Va. Previously, PC users needed terminal-emulation software to access Officepower functionality.

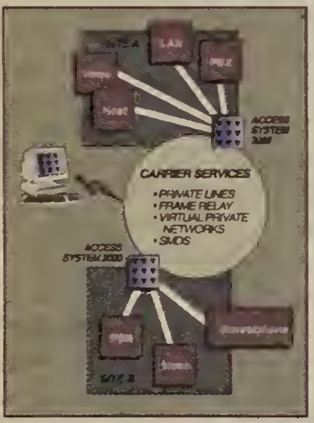
The package of mail-enabled options for all five PC applications costs $1,500 and is available now.

Within the next year, ICL plans to integrate additional PC applications with Officepower and provide a tool kit so that developers can integrate any application with Officepower. ■

Access System 2000.™
Freedom Comes With
The Ability To Change.

The issues are access and freedom. Access *to* existing and emerging carrier services --- private lines and virtual private networks, frame relay and SMDS. And freedom *from* communications managers' most recurring nightmare --- equipment obsolescence. Access System 2000, Verilink's versatile network access system, gives you the access, the freedom and much more.

T1 To Subrate, Frame Relay To SMDS, You Have The Freedom To Adapt --- And Grow.



Access System 2000 is designed to effectively deal with changing technologies in communications environments notorious for short product life cycles. It gives you intelligent T1 and fractional T1 interfaces, as well as high and low speed digital applications interfaces. There's DSU/CSU functionality, of course. And T1 and subrate time-division multiplexing functionality. You get access to today's frame relay networks. And tomorrow's SMDS networks. All in a compact dual-line package. Or a multi-line, multi-port model that optimizes operational flexibility and expansion.

Extend The Life Cycle Of Your Investment.

Change can be a beautiful thing, particularly when it means return on your investment and not replacement of it. Call us toll-free at (800) 456-0589 for details on Access System 2000. Verilink Corporation. 145 Baytech Drive. San Jose, CA 95134.

VERILINK
Building Tomorrow Into Today's Networks.

Access System 2000 is a trademark and Verilink is a registered trademark of Verilink Corporation

Circle Reader Service #111

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

> "Having vendors and users come to an agreement on a standard messaging [application program interface] is a tough course, but I think it is the only course. The confusion over APIs that exists is only resulting in inactivity."

Judith Rosall
Electronic messaging
program manager
International Data Corp.
Framingham, Mass.

People & Positions

Emily Green last week was named associate vice-president of strategic marketing at **Fibermux Corp.**, a Chatsworth, Calif., maker of wiring hubs and multiplexers. She will be responsible for evaluating technology and market trends, and defining product development strategies five to seven years out. She also assumes responsibility for evaluating business partners. Previously, Green was director of major accounts and director of product marketing at Fibermux.

Lotus Development Corp. last week named **Rex Cardinale** vice-president and general manager of its **cc:Mail** division in Mountain View, Calif. Cardinale replaces **Eric Hahn**, who is leaving Lotus at the end of July to pursue other interests. Cardinale will be responsible for all development and product marketing activities for cc:Mail, a vendor of electronic mail software. Cardinale previously was vice-president of advanced technology at San Jose-based Ultra Network Technologies. ◘

'Politics as usual' stalling House Antitrust Reform Act

Bill would keep Bells from offering info services.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — Political infighting between House Democrats over telecommunications policy is threatening to halt the rapid progress of Rep. Jack Brooks' (D-Texas) bill, the Antitrust Reform Act, designed to keep the Bell companies from offering information services.

The House of Representatives Energy and Commerce Committee, chaired by Rep. John Dingell (D-Mich.), has asked House Speaker Tom Foley (D-Wash.) to force Brooks' Judiciary Committee to send the Antitrust Reform Act, now ready for a full House vote, to the Commerce Committee for review.

Foley is expected to rule on the committee jurisdiction matter this week. But whatever his decision, the bill appears to have come to a screeching halt in the legislative process.

The Antitrust Reform Act has become a political football, with Democrat tackling Democrat as the Commerce Committee vies with the Judiciary Committee for control over telecommunications policy. Commerce Committee members, feeling that their turf has been invaded, are asserting that information services is not simply a legal issue suited for the Judiciary Committee but a telecommunications issue belonging to them.

Brooks has refused to send his bill, which would stop the regional Bell holding companies from offering information services, to the Commerce Committee for review. If Foley, as the mediator in the argument, does not grant Dingell's referral request, mem-

(continued on page 34)

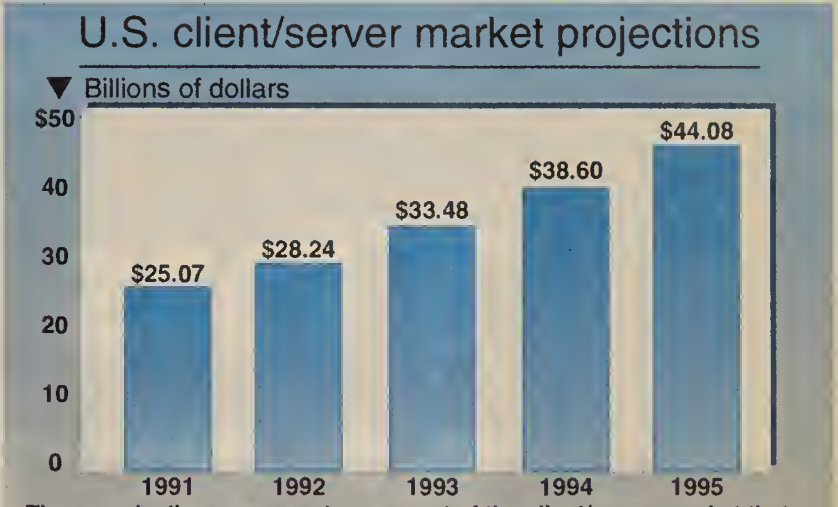
Rep. Jack Brooks

INDUSTRY BRIEFS

DCA reports financials. Digital Communications Associates, Inc. recently reported revenue of $58.9 million for the fourth quarter, ending June 30, up from $47.1 million for the corresponding quarter of last year. The company posted quarterly earnings of $6.4 million, compared with $1.8 million last year. For the year, DCA reported sales of $209.4 million, compared with $191.4 million last year, and earnings of $19.7 million, compared with $15.4 million the year earlier.

DEC to spend $8 million on Auspex gear. Auspex Systems, Inc. of Santa Clara, Calif., last week announced that Digital Equipment Corp. has agreed to purchase about $8 million worth of Auspex's network file system servers to use with DEC equipment in systems integration contracts. DEC will install and service the Auspex N 5500 and NS 3000 NetServers, which will be integrated with its Unix-based workstations.

CE Software buys Sitka's InBox E-mail offering. CE Software Holdings, Inc. last week announced it has purchased the rights to Sitka Corp.'s InBox electronic mail product. Sitka will continue to provide full technical support for all InBox customers until Sept. 30. Thereafter, all support calls will be transferred to CE Software. Specific plans to integrate InBox into CE Software's own E-mail product, QuickMail, are expected to be announced in the future. ◘



These projections represent a segment of the client/server market that consists of hardware and systems software, including network operating systems. The spending survey is based on interviews with 300 users.

GRAPHIC BY TERRI MITCHELL SOURCE: BUSINESS RESEARCH GROUP, NEWTON, MASS.

Client/server move may alter industry

Jury is still out on which vendors will emerge as leaders in the changing networking marketplace.

By Bob Brown
Senior Editor

The move to client/server computing could result in a network industry power shuffle, depending on how established vendors adjust and emerging companies are embraced, according to industry observers.

Vendors that sell local-area network products and client/server applications are best positioned for this emerging market, according to analysts, while traditional market leaders, such as IBM and Digital Equipment Corp., might lose out by moving to personal computer-centric computing.

But analysts pointed out that the large, established systems vendors sell many of the requisite piece parts for client/server computing and have strong systems integration groups that could ultimately prove ideal for solving users' complex client/server needs.

An informal survey of industry watchers did not turn up any overriding opinion about who will win in the race to the top of the client/server market, but this much is clear: The stakes are huge.

Although it is difficult to reach a consensus about the definition of the market, by some accounts, it includes applications, the client and server computers that support them and network operating systems.

While few client/server applications have emerged, applications are where the action will be, analysts predicted.

"The key to the whole thing is the applications," said Jeanette Sill-Holeman, a principal at Sill-Holeman & Associates, a Redwood City, Calif., computer industry consultancy. "They are what will allow the client/server relationship to function."

The most promising client/server application to date has been Lotus Development Corp.'s Notes groupware product, a software offering that lets users on different computers work together on projects.

"I see Lotus potentially doing well because it is delivering the applications that run on top of client/server operating systems and platforms," said Todd Dagres, director of data communications research at The Yankee Group, a market research firm in Boston.

While mail-enabled applications are scant to date, companies that get them to market early should fare well, he added.

Firms that build applications using the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE) will also generate business in the emerging client/server market, said Richard Rosmarin, president of Mission Critical Technologies, Inc., a Concord, Mass., consulting firm.

DCE is a set of specifications, including remote procedure call technology, designed to help us-

(continued on page 34)

This summer, N.E.T. unveils a plan that will bring nations together more effectively than Henry Kissinger.

Honestly, Mr. Kissinger, we're not trying to fill your shoes. We are, however, staunch supporters of the belief that through improved communications, good things can happen. Which is why at N.E.T., we're developing the networking products you'll need to move information down the hall, across the street or around the globe. Obviously, we'll never solve all of the world's problems. But at least we'll have the capabilities to make sure we all stay connected.

NETWORK
EQUIPMENT TECHNOLOGIES TM

© 1992 Network Equipment Technologies, Inc.

MANAGEMENT STRATEGIES

ENTERPRISE NETWORK STRATEGIES, USER GROUPS AND MANAGING PEOPLE AND TECHNOLOGY

Worth Noting

> "Almost all of the net management products in the industry that I have seen have been priced unattractively. [They] would be much better accepted if they were priced more aggressively."
>
> **Sam Shuler**
> Communications strategy manager
> Texas Instruments, Inc.
> Dallas

Manager Minutes

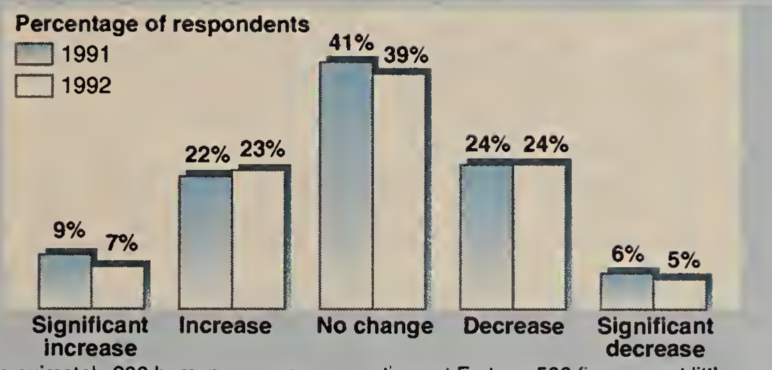
The **Strictly Business Computer Expo,** the largest end-user computer show in the Southwest, will be held Oct. 7 and 8 at the Astrodomain Exposition Center in Houston. Two conferences will be held in conjunction with the exposition this year — the Enterprise Computing Forum: Client/Server '92 and the Unix Options Expo.

Enterprise Computing Forum: Client/Server '92 will address the downsizing trend from mainframe to client/server computing. It will also include presentations of case studies from executives who have adopted client/server technology, as well as sessions on rightsizing, business reengineering, network and database management, and object-oriented programming.

The HOUNIX Vendor Council will host the Unix Options Expo, where R. Elton White, president of NCR Corp., and Eric Schmidt, president of Suntech Enterprises, Inc. and vice-president of Sun Microsystems, Inc., will address Unix topics.

For more information on the Strictly Business Computer Expo and its attendant conferences, call Layne Skoyen at (612) 894-8007. ◪

Recession fails to hurt training, development



Approximately 200 human resources executives at Fortune 500 firms report little change in spending on training and development during 1991, despite a deepening recession.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: AMERICAN SOCIETY FOR TRAINING AND OEVELOPMENT, ALEXANDRIA, VA.

Self-study is vital to pick the best net mgmt. system

TI finds that determining who needs what is key.

By Joanne Cummings
Senior Writer

DALLAS — When Texas Instruments, Inc. set out to choose a network management system, it found the evaluation process encompassed more than just comparing system features. It also entailed identifying the various demands and types of information required by different company departments.

"We needed to learn not so much about the [network management] tools themselves, but the process we needed to put in place in order to better utilize the tools," said Sam Shuler, communications strategy manager at TI.

Although high-level management systems have the ability to provide only the relevant information needed to solve a problem, the trick is figuring out what information is relevant, he said.

"What we have found is that different groups providing different input — the cross-pollination of ideas in terms of the system design and the information that needs to be kept by the system — is what really makes it work," Shuler said.

The groups providing input should include not only net managers and technicians, but also company visionaries, the people who have a handle on the current company strategy and what it may be 10 years down the road.

Network performance and utilization statistics can be valuable planning tools for these visionaries, Shuler said. "It helps them see where the next generation of system architecture needs to be and when," he said.

In addition, the customer service organization that interfaces with the company's various users should also have a say in the types of information required from a network management system.

"When an event occurs [such as a device failure], it's great that the operations side of the house knows about it," Shuler said. "But can the management system tell the scope of impact? What customers are being hit? Operations wants to know exactly where it broke and, to some degree, the scope of impact, but not necessarily who are the people involved. But a customer service organization certainly [needs to know] that kind of thing."

A net management shopping list

Some features TI considers important in a network management system

1. The ability to be integrated with network management systems from other vendors.
2. A simplified user-friendly interface.
3. The ability to use multiple management nodes that can back up one another.
4. Artificial intelligence.
5. Price.

SOURCE: TEXAS INSTRUMENTS, INC., OALLAS
GRAPHIC BY SUSAN J. CHAMPENY

Once this input has been gathered, it's time to look at individual network management system features.

TI has a worldwide Systems Network Architecture network and Ethernet local-area networks

(continued on page 39)

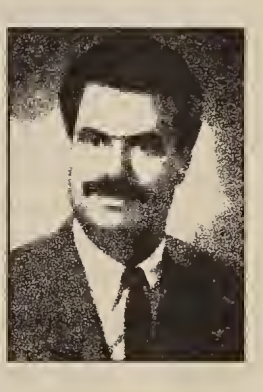
GUIDELINES

BY HENRY FIALLO

Can this marriage be saved?

User-vendor relationships are a lot like marriages: They require good communication and hard work to be successful. My company, Ryder System, Inc., learned this lesson all too well soon after signing a multiyear Special Customer Arrangement deal with MCI Communications Corp. for Vnet, 800, data and billing outsourcing services.

Not long after we signed the deal, our relationship with the carrier started to go south. They could do no right. We were constantly rejecting deliverables or complaining about their lack of productivity. Neither "partner" could figure out how to stop the slide in the relationship. We decided the partnership needed counseling, just as troubled marriages do sometimes.



We elected to conduct an all-day, off-site session with the staffs from both companies. The objective was to try to build one team that could work together successfully.

Such a meeting is not something to take lightly, but it is worth the time investment. Think of it this way: If you don't have the time to invest in the relationship, how will you have the time to deal with the individual problems that arise?

Since we lacked expertise in human relations, human resources professionals from both companies agreed to moderate the session to identify problems and build teamwork.

We began with each group's mission, strategy and annual objectives. We discovered that each side knew its purpose but wasn't clear about the other's. Our department's objective was to use networking to help Ryder fulfill its mission as the premier transportation services company. MCI's account team strived to help us realize our goal, but it also had revenue and expense objectives.

That we lacked this mutual understanding shouldn't have been a surprise, but we had assumed we knew each other's expectations. Once the problem became clear, in less than an hour we were able to decide upon and coordinate a mutual purpose.

Next, our moderators took us through a simple checklist from which all participants selected about 25 personality traits, or characteristics, that best described them. We then handed our checklist to someone from the other company who read it aloud to the group. We quickly realized that the MCI people were just like us. Real human beings with needs and aspirations. Again, not a revelation, but something we had all been too busy to see.

The next exercise split supervisors into one group and staff members into another. We then answered questions about the strengths and weaknesses of both companies. What we found was that certain aspects of our company's culture clashed with MCI's. For example, MCI encourages quick action and accepts less than perfect results as a trade-off to getting work done fast. We demand quickness but without sacrificing quality and integrity.

More importantly, we discovered a generation gap between the two companies' staffs. Our team included seasoned veterans with experience in customer premises equipment, networking and integration. MCI's team was fairly inexperienced, with little equipment knowledge and almost no systems integration skills. This gap was at the root of our disagreements. The discussion was another revelation to us all.

We were then ready for the final phase.

(continued on page 39)

Politics stalling House act

continued from page 31

bers of the Commerce Committee will use their power to try and block the Antitrust Reform Act from going to the House floor for a vote.

House sources predict that the governmental body's leadership — fearful of embarrassment from open warfare during an election year between two powerful Democrats — will not subject the bill to a full vote.

If Foley refers the Brooks bill to the Commerce Committee, sources there say it will be indefinitely stalled since its members do not support it.

Tauzin bill

In reaction to the Brooks bill, Rep. W.J. (Billy) Tauzin (D-La.) has just introduced his own information services legislation, The Fair Competition and Services Act of 1991, which would prohibit the Bell companies from cross-subsidizing information services with earnings from telecommunications services, as well as prohibit Bell company involvement in the burglar alarm industry for 10 years.

But the Tauzin bill does not have the support of telecommunications subcommittee Chairman Edward Markey (D-Mass.), the prime mover of legislation through the subcommittee. House sources said the Tauzin bill is intended "just to tweak the nose of Brooks." The Tauzin bill is unlikely to advance beyond what it is today — a shot across the bow.

Markey is circulating new draft legislation, titled the Telecommunications Competition and Services Act of 1992, looking for comment. The draft proposes requiring the Bell companies to provide information services through a separate subsidiary, although it allows the Federal Communications Commission to waive that requirement, except for electronic publishing.

Rep. John Dingell

Jerry Waldron, Markey's legal aide, said Markey objects to the Brooks bill because U.S. District Court Judge Harold Greene settled the information services issue by allowing the Bells into that business last year.

Markey has unveiled several draft Modified Final Judgment bills in the past few years but has not introduced an actual bill. ■

Client/server to alter industry

continued from page 31

ers and vendors build distributed applications.

Robert Kidd, a senior industry analyst at Dataquest, Inc., a market research firm in San Jose, Calif., said the client/server application market is wide open. "There are probably a lot of small companies most of us have never heard about that could be big in this market," he said.

Among the companies that are already firmly entrenched in the market — and that really spurred it — are Banyan Systems, Inc., Microsoft Corp., Novell, Inc. and other LAN vendors.

"Novell is going to continue to prosper because of the move to client/server," Dagres said.

Kidd agreed that Novell is well positioned, but said Microsoft could be a factor with Windows NT, its forthcoming net-ready server operating system. Other players that will benefit in the client/server market will be vendors of database management systems, such as Oracle Corp. and Sybase, Inc., and superserver vendors, such as NetFRAME Systems, Inc. and Parallan Computer, Inc., said Barry Gilbert, director of the LAN service at InfoCorp, a market research firm in Acton, Mass.

While database vendors are already benefitting from the shift to client/server, it could prove to be an equal boon for superserver vendors that have gotten off to a slower start.

"The superservers are designed to run symmetrical multiprocessing software, such as the [symmetrical multiprocessing protocol] version of Banyan's VINES [net operating system]," he said. "To run true client/server applications, you're going to want to have that kind of horsepower behind it."

Meanwhile, large systems vendors, such as IBM and DEC, have been slow to attack the client/server market and are still transitioning, observers said.

But the systems vendors are moving. IBM, for example, has formed an organization to focus on client/server computing and has taken steps to position even its mainframes to play a role in client/server nets ("IBM targets host in client/server push," *NW*, June 22). ■

Indictment handed down on 'Masters of Disaster'

By Bob Brown
Senior Editor

NEW YORK — Five men were indicted by a federal grand jury here recently on charges of breaking into computers and networks owned by a handful of regional telephone companies, credit reporting services and educational institutions.

The alleged hacker ring was foiled by investigators who, for the first time, were authorized to use wiretaps to monitor computer traffic on phone lines.

The five men, known as the "Masters of Disaster" and the "Masters of Deception," were indicted for computer tampering, computer fraud, wire fraud, illegal wiretapping and conspiracy. They were allegedly stealing credit reports and making illegal long-distance phone calls.

The accused hackers, all of whom are under 23 years of age, used aliases such as Acid Phreak, Phiber Optik and Outlaw. The indictment described hackers as people who use computers or telephones to obtain unauthorized access to other computers.

Among their victims was Southwestern Bell Corp., which had its AT&T 5ESS switch in El Paso, Texas, infiltrated. The defendants tampered with the carrier's computers and altered calling features to make long-distance calls for the price of local calls, among other things, according to the indictment.

The carrier was forced to spend $370,000 to investigate the break-ins and reprogram its computers. Other than that, the hacking had little financial impact on the affected companies.

A Southwestern Bell spokesman said the break-ins to the carrier's switch did not affect customer service or billing.

The defendants were also said to have accessed BT North America, Inc.'s public packet network and intercepted data from the net's users, including Bank of America National Trust & Savings Association. Further details were not available at press time.

The hackers allegedly stole 176 credit reports from TRW Financial Systems, Inc., a credit bureau company. None of the reports were altered, but they were supposedly sold to private investigators. According to the indictment, one hacker discussed obtaining and altering credit information in order to "destroy people's lives . . . or make them look like saints."

The indictment also said members of the hacker ring erased almost all data housed in a computer operated by the Education Broadcasting Corp. here. The computer was used to provide instructional information to hundreds of area schools.

The hackers' activities took place over a period of two years, investigators said. The investigation was conducted jointly by the U.S. Secret Service and the Federal Bureau of Investigation.

David Stang, director of research at the International Computer Security Association, which tracks viruses and addresses security issues, said the alleged hacker ring points out yet again that organizations using computers and running networks do not pay enough attention to security.

"Network security is a contradiction in terms," Stang said. "If you operate a big network, it's vulnerable to break-ins." ■

ATM emerging as alternative

continued from page 21

up a prototype ATM LAN with one of the ASX-100 switches and integrating it with production networks at the naval facility.

The ATM LAN was running at 155M bit/sec on a number of workstations supporting services such as yellow pages, Network File System and Andrew File System, as well as voice and live video applications. The lab expected to scale up to 622M bit/sec as the test progressed.

"We're very pleased with the results so far," said Hank Dardy, a researcher at the Naval Research Laboratory. "FDDI is not capable of providing the bandwidth that's needed in an environment that combines data with voice, video and imaging applications. ATM technology gives us that ability."

According to industry observers, today's intelligent hubs, unlike ATM switches, cannot support multimedia applications such as voice and video. It appears that offerings providing such support will be in demand at both the workstation and wide-area network level.

It was with this in mind that the Department of Defense undertook its ATM trials and sought a way to improve communications. "Not only are we looking at performance improvements and improved productivity at the workstation level, but also the introduction of new, powerful services," Dardy explained.

In an unrelated Defense Department project, Sun Microsystems, Inc. in May and June tested Fore Systems' SBA-100 SBus, an ATM adapter board supporting fiber links between Sun SPARCstations and ATM switches at 100M or 140M bit/sec.

Although detailed analysis has not been completed, Sun said it was pleased with the preliminary results from the prototype ATM campus net that was set up to connect three of its buildings.

"We used it quite extensively, and it performed well," said Fred Sammartino, manager of high-speed networking at Sun's Advanced Development Division.

Fore Systems' Cooper is convinced that ATM to the desktop will be important in the near future. "The ATM-to-the-desktop market needs to grow up," he said. "As all the PCs increase in power and outgrow their Ethernets, ATM to the desktop will be there waiting for that mass market to catch up to it."

According to Todd Dagres, director of data communications research and consulting at The Yankee Group, a Boston consulting firm, that mass market may be more than two years away.

"ATM will be very successful as a technology, but it's going to take some time to implement," he said. "The bottom line is that hubs and concentrators aren't going away. You're going to see more switching built into the hubs, and ATM will be the interface and switching fabric for those hubs. But ATM will not be the tidal wave in the next two years that the ATM vendors are claiming." ■

NCR to offer global support

continued from page 21

meanwhile, Cisco became the first internetworking vendor to implement the Internet Engineering Task Force's (IETF) Request For Comment (RFC) 1144 standard for header compression, which reduces the bandwidth required for interactive TCP/IP sessions over serial lines that run slower than 56K bit/sec.

A TCP/IP header consists of 40 bytes of address and other information that directs a packet to its destination.

The IETF RFC 1144 standard calls for caching the constant part of the header — about 20 bytes — as well as the sequential and other information, resulting in header size reduction of up to 80%.

The header compression feature will be available next month at no cost. ■

THERE ARE TWO PLACES WHERE COMPLEX NETWORK INTEGRATION PROBLEMS CAN BE WORKED OUT.

Circle Reader Service #116

YOUR PLACE

As surprising as it may seem, there are many clone companies that boost profit margins by not hiring enough designers and doing dangerously little testing. What does it all mean? It means that your network is the unofficial test site for their server.

Introducing the design and testing engineers of our Systems Division at Compaq headquarters in Houston, Texas.

These are the same people who've built our reputation for developing the servers of choice in the computer industry.

In fact, in a recent survey, the readers of *LAN Times* selected COMPAQ 386- and 486-based file servers over all others – including IBM, Northgate, Dell and AST–for the second year in a row.

Becoming this good requires rigorous network testing for months. This process–which we believe has no equal in the entire PC server industry–is referred to affectionately as "The Meat Grinder."

© 1992 Compaq Computer Corporation. All rights reserved. Printed in the USA. COMPAQ, SYSTEMPRO Registered U.S. Patent and Trademark Office. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. *This limited warranty service is provided by contract Service Providers and may not be available in certain geographic locations. Consult Compaq Customer Support Center for further details

OR OURS.

Virtually every conceivable kind of test is run using literally hundreds of different applications, configurations and cards. Running on the world's four most popular network operating systems.

But to be perfectly honest, not all development and testing takes place at our place.

Because the engineers at Novell, SCO, Microsoft and Banyan—in long-standing technical alliance with Compaq—work to make sure that you get both the easiest integration and highest performance possible.

Unfortunately, those engineers were unable to make it to the above photo session.

Nor could the specialists who created the COMPAQ ToolKits and TechNotes—the industry's most sought-after guides for multi-vendor network integration.

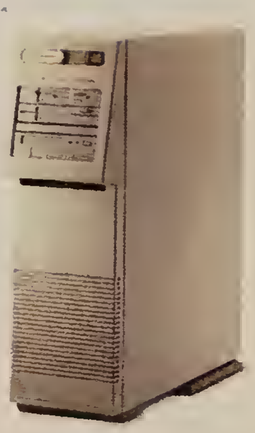
Or the thousands of technicians who provide you with a full year of free, on-site service.*

Or the experts who staff our free technical support line, resolving 95% of your questions in 15 minutes or less.

For more information about everything Compaq has to offer, just call us at 1-800-345-1518, ext. 200 in the U.S.A.

In Canada, call us at 1-800-263-5868, ext. 200.

When it comes to PC server-based computing, you'll see there really is only one place to go.



The new enhanced COMPAQ SYSTEMPRO models feature the latest drive array controller, dramatically increasing I/O throughput.

The COMPAQ Server Manager/R lets you monitor and diagnose your server remotely. In the event of a problem, it calls your beeper—preventing any downtime before it happens.

NOVELL SCO Microsoft BANYAN

Our key technical alliances with major operating systems ensure optimum performance and support of your PC network.

COMPAQ

Circle Reader Service #116

Say Good-bye To The Language Barrier.

Breakdown

A global computing event that unites, under one roof, today's connectivity experts for one targeted purpose — to pronounce that networking is the universal language of choice.

NetWorld 92
The United Nations Of Networking

NetWorld 92 is the talk of the connectivity industry. A cutting-edge exhibition of conferences and seminars where hardware and software developments are introduced, discussed and demonstrated. A conference that speaks the language of productivity and translates ideas into action.

Whether you communicate over LANs, WANs or wireless networks, or operate over diverse operating systems, NetWorld 92 is your primary venue for innovative products and services. Converse in many languages with industry-leading manufacturers and form a lasting connection that can translate into increased efficiency and sales.

Educational Seminars
A Universe Of Networking Possibilities

NetWorld 92 presents an encyclopedic display of intensive educational conferences and hands-on educational seminars on internetworking. Digest state-of-the-art terminology and processes that can propel your present networking plans forward, allowing you to expand software applications into new environments. And learn an unlimited vocabulary that will place you at the forefront of future strategies.

Improve Your Communication Skills

Don't isolate yourself and your company within the confines of yesterday's network architecture. NetWorld 92 lets you open the lines of communication, resulting in bottom-line benefits to your company.

For additional show information, contact Jodi Levine, Show Manager, at 201-346-1400 or Fax 201-346-1602.

NETWORLD 92 Dallas
The Universal Language

October 13-15, 1992
Dallas Convention Center

U.S. Department of Commerce · U.S. and Foreign Commercial Service · International Trade Administration

Foreign Buyer Program

Bruno Blenheim Inc. • Fort Lee Executive Park • One Executive Drive • Fort Lee, NJ 07024 • 201-346-1400 • 800 829-3976 • Fax: 201-346-1602

NetWorld Expositions in the U.S.A. and Europe are owned, produced and managed by Bruno Blenheim Inc. NetWorld is a servicemark of Novell, Inc. licensed exclusively in the U.S.A. and Europe to Bruno Blenheim Inc.

Self-study is vital to pick mgmt. system

continued from page 33

supporting 75,000 terminals and workstations in addition to 22 mainframes at 44 manufacturing sites and 296 sales and service sites in 30 countries. It relies on IBM's NetView to manage the SNA side of the net and Cabletron Systems, Inc.'s Spectrum for managing the LAN portion.

Shuler detailed several features TI deemed important when choosing its management systems (see graphic, page 33).

> "One of the key questions for us is, can [the system] take you to where it believes the problem is without having to walk through window after window?" Shuler said.
>
> ▲▲▲

The first was the ability to work with other management systems. Spectrum fit because it offered a bidirectional link to NetView and is also beginning to be upgraded to support other vendors' devices through the recently announced Partners Program.

"The tool must interoperate with other [management] systems and maybe a voice system, as well," Shuler said. "Then you have a very powerful, high-level, integrated view of a network."

TI is currently working on a link from Spectrum to help manage its voice net, but Shuler declined to comment further.

In addition, TI wanted a system that could provide a simple user-friendly interface. "We're seeing a lot of systems that let you open pretty windows," Shuler explained. "One of the key questions for us is, can it take you to where it believes the problem is without having to walk through window after window?"

He said most management systems require stepping through so many windows that system operators develop what he calls "operator glaze-over," or the inability to correlate the vast amounts of information on the screen. "Simplicity is the key," he said.

Next, TI wanted the system to operate in tandem with other systems so that if a management node controlling one part of the network is disabled, a node controlling another part can take over, enabling the manager to provide redundant network control.

"The ability to have multiple management nodes that can back up one another must be an inherent design feature of the system," he said. TI currently uses multiple Spectrum systems in its LAN environment that can serve as backups for one another. NetView, however, does not yet have this capability, he said.

Another important feature to TI was the ability to offer some type of artificial intelligence. "The more the system can do itself in terms of diagnosing the problem, the more it helps us in the long run," Shuler said. Spectrum's AI ability was a main selling point.

Finally, pricing was a consideration. "Many vendors think very highly of their network management systems and price them accordingly," Shuler said, noting that the cost is not always in line with the value to the user. "Network management systems are very subjective, and each user must determine what the real value of the system is and evaluate price based on their individual needs," he said. ◪

Can this marriage be saved?

continued from page 33

We formed teams of employees from both companies and participated in a fictional board game of land exploration and development. Over the course of 45 minutes, the final exercise succeeded in bringing diverse groups together to function as a team.

The day ended with the realization that we could function as a team and with a commitment to continue team-building efforts. While work is needed to establish a process whereby problems can be identified and resolved as they arise, we succeeded beyond our expectations in discovering one another's humanity and realizing teamwork was possible. We found that with vendor relationships, like marriages, there is no substitute for communication, understanding, flexibility and teamwork.

Fiallo is group director of telecommunications and MIS planning for Ryder System, Inc., a Miami-based provider of transportation services.

The Managing Enterprise Networks Conference

Boston
July 27-28, 1992

This comprehensive network management conference covers the newest developments and strategies for managing local-area networks, internetworks, and wide-area networks.

Conference Co-Chairmen:

Daniel D. Briere
President, TeleChoice, Inc.

L. David Passmore
Vice President, Gartner Group

The Issues
- Cost Justification for System/Network Management
- Managing Enterprise LANs
- Managing Distributed Systems and Remote LANs
- Managing the Enterprise – à la IBM
- SNMP Management
- Bandwidth and Transmission Management Options
- Managing Hybrid Public & Private Networks
- Integrated Network Management Platforms & Architectures
- Managing Frame Relay Networks
- Managing Global Networks
- People, Process & Organization

Special Seminar
- Evaluating Network Outsourcing Alternatives

Sponsored by:

DCI
Digital Consulting

NETWORK WORLD

Exhibitors:

Ascom Timeplex, Inc.*
BellSouth Advanced Networks*
Bytex Corp.
Cabletron Systems, Inc.*
Cisco Systems, Inc.*
Comdisco Systems, Inc.
Comlink Network Services, Inc.
Connectivity, Inc.*
Digital Equipment Corp.*
Distributed Technologies Corp.
Hewlett-Packard*
International TeleManagement*
LANDA
Network General Corp.
Novell, Inc.*
ProTools Inc.*
Remedy Corp.
Telecommunications Techniques Corp.*
Vitalink Communications Corp.*
Wellfleet Communications, Inc.

*Conference Co-Sponsors

#A0WYWN

Attendees:
Call (508) 470-3880 to receive a complete conference brochure.

Exhibitors:
Call Jean Desmaris at (508) 470-3870 to reserve your booth.

Because BIGG

Introducing the AT&T MEGACOM® FAMILY OF SERVICE

If you're a bigger company, one that spends between $3,000 and $30,000 a month on long distance, AT&T now offers a unique and exciting choice of services: the AT&T Megacom Family of Services.

Megacom Plus* Service and Megacom Optimum Service are the *newest* members of the family for single- or multi-location businesses. Like Megacom Service, and Megacom 800 Service, they can give you all the reliability, service, and flexibility you need—at very competitive prices.

If you're a bigger business, take a minute to find out which Megacom service meets your needs best. Sign up before 10/15/92 and you'll receive ***free installation*****

AT&T MEGACOM PLUS SERVICE

A new outbound service, with additional savings and a choice of features, intended especially for companies with multiple locations of all sizes.

- Combine calls from all your locations, including domestic, AT&T Calling Card, international and USA Direct® calls, into one bill—available in a choice of billing formats: PC disk, magnetic tape, or hard copy.
- Spot trends and identify potential calling fraud with the optional PC billing package. Select from 56 standard reports or customize your own.
- Features the advanced maintenance service option, MegaWatch,SM which proactively monitors your service and equipment to help keep your business up and running.
- Volume and term plan discounts available for even greater savings.

More choices for bigger businesses. Because one size does not fit al

© 1992 AT&T *Pending FCC approval. **Installation must be made by 12/31/92.

ER

comes in many sizes.

for businesses spending between $3,000 and $30,000 a month on long distance.

AT&T MEGACOM OPTIMUM SERVICE

For single- or multiple-location businesses, this new service is the "gold standard," offering all the features included in Megacom Plus Service, and more, with the highest level of outbound service and support available from AT&T.

- Features a dedicated 24-hour customer support center to handle your long distance operation, installation, and maintenance.
- Includes the standard PC billing package. Choose your own bill format, even CD ROM, to give you incredible flexibility.
- Choice of 20 different billing dates. Choose the one that best fits your company's cash flow.
- Includes state-of-the-art monitoring to help spot problems before they interfere with your calling.
- Choice of two domestic rate structures: single postalized rates or 3-tier mileage rate structure.

AT&T MEGACOM SERVICE

- Offers single-location companies essential features: AT&T quality and reliability at competitive prices.
- Opportunity to add on powerful options, such as MegaWatch, the 24-hour proactive maintenance service.

AT&T MEGACOM 800 SERVICE

- Guaranteed emergency backup service in 30 minutes or less if service is ever interrupted.
- Advanced routing features help you complete more calls.

INTERNATIONAL FEATURES

- Available with any Megacom service—gives you the clearest connections to over 200 countries and areas around the world.
- Includes the exclusive AT&T Language Line® Services, which give you an on-line interpreter in 140 languages.

all 1 800 858-MEGA, ext 52.

AT&T
The right choice.

OPINIONS

FDDI OVER COPPER

BY ERNEST EUGSTER

Users would be better off waiting for ANSI standard

Development of competing techniques for Fiber Distributed Data Interface over copper is causing compatibility problems. Users looking to implement copper FDDI today must choose from three major 100M bit/sec-over-copper techniques and risk incompatibilities in products. Instead, they would be better off waiting for a single ANSI standard that resolves differences in the competing techniques.

Some vendors are using "green book" specifications to produce products that support FDDI over shielded twisted-pair Types 1, 2 and 6. Digital Equipment Corp. and SynOptics Communications, Inc. shipped the first green book products last fall.

Vendors such as IBM are also rushing products to market in the absence of standards and putting copper FDDI's future in jeopardy. IBM and a group of 10 other computer, communications and chip vendors that includes AMD Co., Chipcom Corp., Madge Networks, Inc., Motorola, Inc. and National Semiconductor Corp. are supporting a copper FDDI technique called SDDI. One of SDDI's advantages is that users can install a multivendor copper FDDI network supported by leading adapter, hub and chip vendors. More importantly, users can install SDDI much earlier than those that wait for a common ANSI standard for FDDI over shielded twisted pair and unshielded twisted pair.

But SDDI's major disadvantage is that it is incompatible with green book shielded twisted-pair products and ANSI's proposed common standard. Also, it is not clear how SDDI will accommodate the inevitable ANSI standard.

The standard on which ANSI is working offers major advantages over SDDI because ANSI proposes running FDDI over both Type 1 shielded twisted pair and Category 5 unshielded twisted pair. Early on, standards makers realized that for copper FDDI to be successful, the standards must accommodate unshielded twisted pair, which is less costly and more widely installed than shielded twisted pair.

Vendors developed their own techniques because ANSI encountered delays in its standards-setting process when investigating which competing encoding and equalization schemes would best meet Federal Communications Commission emissions rules. Bypassing the standards process enabled the vendors to get their products to market quickly.

Fortunately, good news came last month when an ANSI working group finally agreed on the MLT-3 encoding scheme proposed by Cabletron Systems, Inc. and Crescendo Communications, Inc. Now ANSI can proceed with recommendations for other copper FDDI implementation issues such as connectors and cable plant specifications.

Users looking to benefit from copper FDDI face a confusing situation, indeed. To ease decisions, some vendors such as Network Peripherals, Inc. are exchanging green book products for products based on competing techniques for a small fee. That company plans to continue supporting green book shielded twisted pair and SDDI, although the two remain incompatible.

Although it may be another year before the standard is complete, users should wait for it before purchasing equipment. History has shown more than once that the only way to take full advantage of technology is through standards.

Eugster is a principal consultant with DataConsulting International in El Rancho, Colo., which specializes in international local- and wide-area network managment consulting services.

NETWORK WORLD

Editor
John Gallant

Executive Editor
John Dix

Assistant Managing Editor — News
Paul Desmond

Senior Editors
Bob Brown — Industry Update
Jim Duffy — Data Net Architectures
Wayne Eckerson — Management Strategies
Bob Wallace — Global Services

Michael Cooney — Data Net Architectures
14701 Bentley Square
Centreville, VA 22020
Phone: (703) 830-8138
Fax: (703) 830-7963

Caryn Gillooly — Local Networking
5423 Gladewright Drive
Centreville, Va. 22020
Phone: (703) 266-1537
Fax: (703) 266-1543

Senior Writers
Joanne Cummings — Internetworks
Maureen Molloy — Internetworks

Staff Writer
Skip MacAskill — Internetworks

West Coast Bureau
Timothy O'Brien
Bureau Chief/Enterprise Applications
Phone: (415) 771-3530

Margie Wylie
Senior Editor/Local Networking
2088 Union Street, Suite 2
San Francisco, Calif. 94123
Phone: (415) 771-4103
Fax: (415) 771-2817

Washington D.C. Bureau
Anita Taff
Bureau Chief/Global Services
Phone: (202) 879-6744

Ellen Messmer — Industry Correspondent
National Place
1331 Pennsylvania Ave. NW, Suite 505
Washington, D.C. 20004
Phone: (202) 879-6752

Features Editor
Charles Bruno

Managing Editor — Features
Jim Brown

Associate Features Editors
Susan Collins
Alison Conliffe

Design Editors
Susan Champeny
Susan Slater

Assistant Managing Editor — Production
Beth Khoury

Associate Editor
Michelle Beaulieu

Copy Editors
Karen Moltenbrey
Monica Sambataro

Assistant to the Editor
Cheryl Tynan

Editorial Assistant
Glenna Fasold

Contributing Editors
Daniel Briere
James Kobielus
Alan Pearce

Teletoons
Phil Frank
Joe Troise

President/Publisher
Colin B. Ungaro

Director of Financial Operations
Mary Fanning

Network World
161 Worcester Road
Framingham, Mass. 01701
(508) 875-6400
MCI Mail — 390-4868
Fax: (508) 820-3467
R.A.F. hot line:
(800) 622-1108, Ext. 487

USER ADVISORY PANEL

Laurie Bride
Manager, Communications Technology,
Boeing Computer Services
Roy Bruce
Senior Adviser, International Communications Association
Manager of Voice Communications, The Coca Cola Co.
Byron Comp
President, Association of Banyan Users International
Senior Technology Specialist, Marshalls, Inc.
Phillip Evans
Senior Advisor, International Communications Association
Telecommunications Consultant, Perot Systems Corp.
Len Evenchik
Director of Communications,
The Commonwealth of Massachusetts
Thomas Festa
Communications Director, Liberty Brokerage, Inc.
Lionel Gillerman
Telecommunications Services, McDonnell Douglas
Aerospace Information Services Co.
Vice-President for Regulatory Affairs,
Tele-Communications Association, Inc.
Robert Hamilton
Information Technology Engineer, Hewlett-Packard Co.
President, Tele-Communications Association, Inc.
E.W. Bud Huber
Senior Consultant, Hughes Aircraft Co.
Chairman, User Alliance for Open Systems
Michael Kaminski
Manager, CIM/Networking Technologies
General Motors Corp.
Michael Kilbane
President, International Communications Association
General Manager of Systems Development,
Diamond Shamrock R&M, Inc.
Ron Kopitowsky
Telecommunications Director, Metropolitan
Transportation Authority of New York State
First Past President
Communications Managers Association
Charles Murray
President, Communications Managers Association
Telecommunications Director, The Travelers Insurance Co.
Chuck Papageorgiou
Network Administrator, United Parcel Service, Inc.
Henry Pfendt
Director, Information Technology Services,
Eastman Kodak Co.
William Pomeroy
Director of Telecommunications Public Policy,
International Communications Association
Richard Sidoll
Telecommunications Director, Morgan Stanley
Laura Swanton
President, NetWare Users International
Hughes LAN Systems, Inc.
Jane Videtich
President, ICA Systems
Systems Development Manager,
R.J. Reynolds Tobacco Co.
Stanley Welland
Manager, Corporate Telecommunications
General Electric Co.
Ronald West
President, Association of Data Communications Users
Manager of Telecommunications and Office Automation,
Shearman & Sterling

EDITORIAL

Congress needs to reexamine its regulatory objectives

In recent commercials, Chrysler Corp. Chairman Lee Iacocca advises you "have to lead, follow or get out of the way." Congress ought to listen.

For years, Congress has longed to take the reins of telecommunications policy. Spouting lofty rhetoric about laying the foundation for a more competitive U.S., Congress has drafted bill after bill designed to alter the restrictions placed on regional Bell holding companies. Each has wound up in the exact same place — nowhere.

Recent goings-on in the House of Representatives show why Congress — motivated more by power politics than public interest — is unlikely ever to control the telecommunications industry.

Earlier this year, Rep. Jack Brooks (D-Texas), head of the powerful Judiciary Committee, introduced his Antitrust Reform Act, which mapped out eligibility requirements for the RBHCs to enter forbidden markets. Brooks' bill was making some progress in the House until the tired turf wars began.

The Energy and Commerce Committee, chaired by Rep. John Dingell (D-Mich.), wants the Judiciary Committee to send the bill, now ready for a full House vote, over to the Commerce Committee for review. Commerce folks feel telecommunications is their baby.

But Brooks has refused, and Commerce Committee members are threatening to delay a full vote on the legislation. Also, other House members are circulating new bills on the issues.

The RBHCs and their competitors are rightfully concerned about all this wrangling because it prevents them from doing any strategic business planning. And worse, it confuses users.

Taking Iacocca's advice, Congress has three choices. It could lead by bringing together key players to back a single bill based on the real needs of U.S. businesses and not the petty interests of entrenched politicos.

It could follow by supporting the Department of Justice in its attempts to balance the market power of the RBHCs against the benefits of allowing the carriers into new businesses.

Or it could just get out of the way.

DISTRIBUTED COMPUTING

BY JOHN R. RYMER

Users could benefit from downsizing's hidden costs

Users today face tremendous pressure to implement distributed computing architectures such as client/server in order to reduce corporate costs while still relying on information systems to enhance corporate performance. The trouble is that the anticipated savings from distributed computing often seem to evaporate in the face of hidden costs incurred when moving from an old architecture to a new one.

Users typically save big bucks on hardware and operating system software only to spend much more money and time than anticipated writing application code. The reason for the additional development costs is that programmers and other members of the MIS staff don't yet understand how to effectively use the new platform. However, these aren't really hidden costs at all, but an investment in putting together a more functional and flexible computing architecture.

Users make the journey to distributed computing architectures from a variety of starting points. Some are getting into distributed computing as they seek to downsize mainframe applications to fit onto less expensive local-area network servers. However, these users are surprised to discover that their move to a distributed platform presents different application development and management challenges than a centralized environment.

For others, such as money management firm BEA Associates, the impetus is the need to change suppliers.

Thanks to pioneering users such as BEA, we're beginning to understand these costs and how to deal with them. At the recent Executive Uniforum symposium in Santa Barbara, Calif., George Caneda, BEA's information systems chief, shared his experience in migrating from a Hewlett-Packard Co. HP 3000-based architecture to a Unix-based distributed architecture. The key, he says, is to recognize and manage the costs of shifting from an old paradigm — host-based proprietary computing — to a new one — distributed computing.

Because HP was unable to provide BEA with a large enough processor to accommodate its capacity requirements, BEA elected to install Unix servers, personal computer clients running Microsoft Corp.'s Windows 3.0, a third-party relational database management system and a Transmission Control Protocol/Internet Protocol network.

Caneda's experience is instructive. As expected, his company saved money on the purchase price of the basic hardware and operating system software, as well as on application software, because there are more choices for Unix than for his proprietary box.

But from there, Caneda encountered what he now calls "paradigm costs" that blew away his savings. A paradigm cost is what users pay for changing the way they build and manage information systems.

Paradigm costs that Caneda experienced included those associated with making immature or incomplete products whole. Caneda encountered these costs when seeking to build a database to support his applications. The database software, as it turned out, was immature in large-scale applications — meaning that it broke a lot. Now, three years later, all of the problems are fixed. But in the meantime, the problems caused Caneda's staff additional software development costs (for "workarounds" and fixes) and lost time.

In addition, Caneda also ran into relearning costs — the costs of learning new application design methods and development techniques and tools. In BEA's case, the major costs in this area were learning the C language, how to build client/server applications using TCP/IP networks and how to build graphical user interface applications. Caneda's entire staff — from operations personnel to application developers — had to learn to use new tools. The training they undertook cost money, and training is time taken away from building systems.

These paradigm costs indicate that BEA was doing more than simply duplicating existing functionality on a lower cost platform. This is the key point to master in trying to understand and control the costs of a migration. Merely replacing a computing architecture doesn't change your way of building and managing systems and, therefore, does not constitute a paradigm shift.

But if your move to distributed computing is designed to deliver additional flexibility and functionality over time, be prepared to pay for those benefits. The payment for these benefits is simply an investment you make in your new information systems base for applications that should be more flexible and cost-effective than the base it replaces.

As Caneda concludes, "We can do things [with the new base] that we couldn't easily do before — things such as client/server applications, interapplication integration and integration of new systems with old ones" — by design, and paid for without hidden costs.

Rymer is vice-president of the Patricia Seybold Group in Boston and editor in chief of Patricia Seybold's Distributed Computing Monitor.

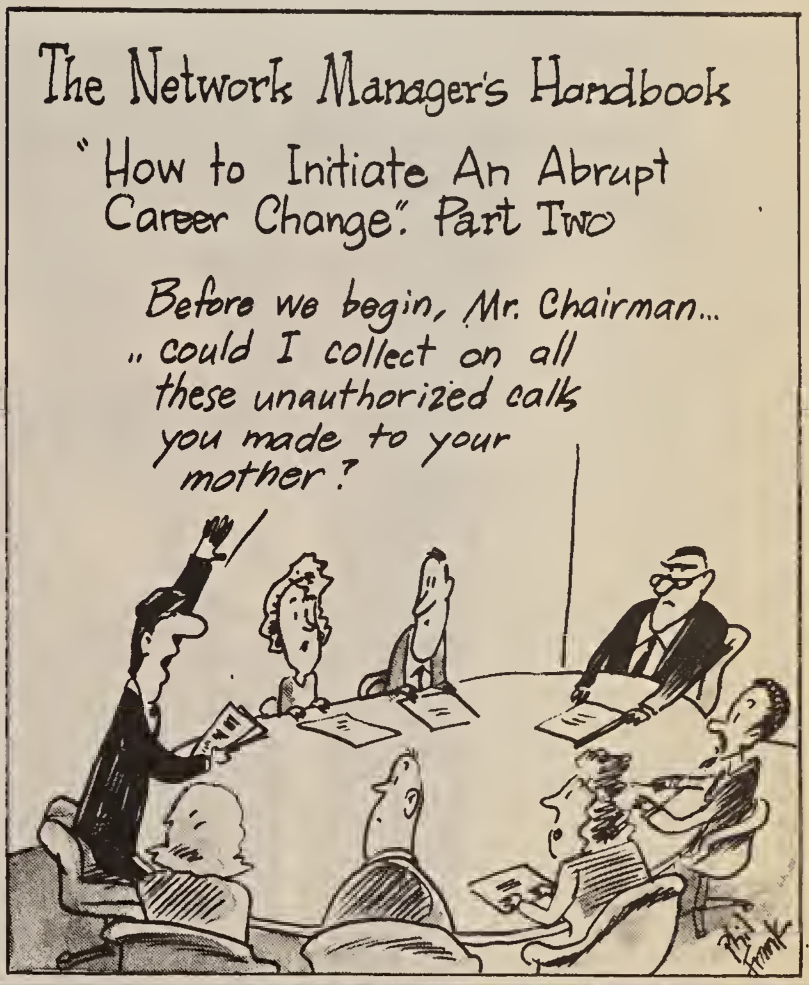
HAVE YOU SURVIVED AN ALLIGATOR ATTACK? If you solved an unforeseen problem that plagued your network, write an article about it for our "Alligators in the Swamp" section.

Alligators should be 1,200 words in length and submitted on disk, via modem or through MCI Mail at 390-4868.

If you have an idea for an Alligator article, call Susan Collins, associate features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467.

TELETOONS

BY FRANK AND TROISE


The Network Manager's Handbook
"How to Initiate An Abrupt Career Change". Part Two
Before we begin, Mr. Chairman... .. could I collect on all these unauthorized calls you made to your mother?
Frank

LETTERS

Texas PUC not puppeteer

I'm writing regarding the recent column by James Carlini titled "Let's cut the strings on state 'puppet' utility commissions" *(NW,* June 29).

Contrary to statements made in this column, the Texas Public Utility Commission (PUC) is not a puppet whose strings are being pulled by either Southwestern Bell Telephone Co. or any other regulated utility in Texas.

The rules promulgated by the PUC are not intended to protect local exchange carriers from competition (with the possible exception of franchise certification). If the rules did act as the column suggests, how can you explain the proliferation of new products, services and vendors, especially since the AT&T divestiture of 1984?

The column also bemoans the dearth of technologists on PUC staffs. Many members of the Texas PUC have degrees in engineering and are certified as professional engineers, and many have experience in telecommunications.

Still, technologists should not determine when new services and technologies should be brought to market; the market itself, comprising users and suppliers, determines when new products and services are needed and can be viably introduced.

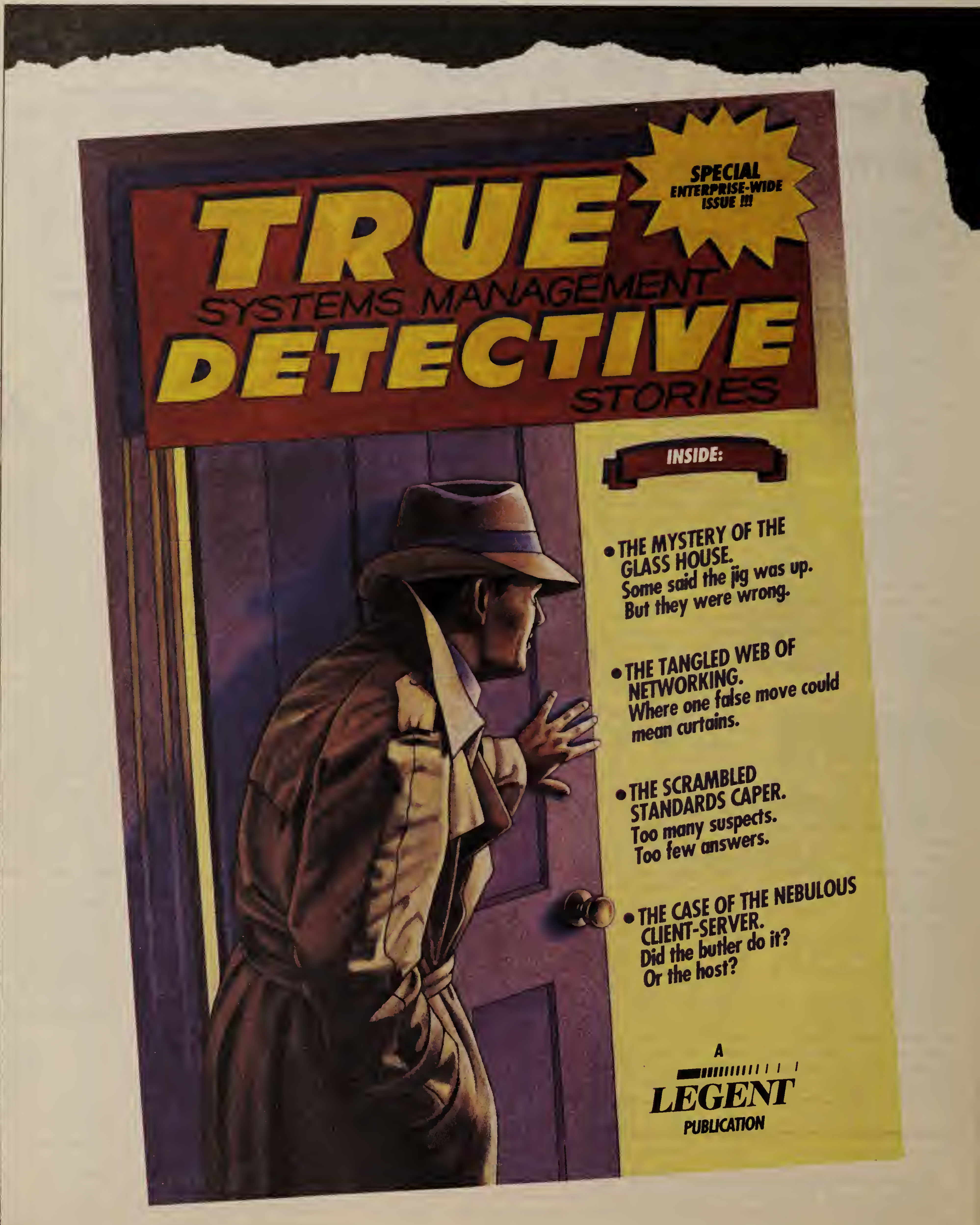
With that in mind, I think PUC staffs need more marketers, not more engineers. Bringing marketing expertise to PUC staffs will help them better understand pricing, competition, market forces, user needs and service applications.

Fred Goodwin
Area manager of
rate administration
Southwestern Bell
Telephone Co.
Austin, Texas

Do you disagree with an article you've read in Network World? *Write us a letter about it.*

Hard copy should be typed, double spaced and mailed to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701 or faxed to (508) 820-3467. If you prefer, letters can be sent via MCI Mail at 390-4868 or uploaded to our Bulletin Board System. (See page 2 for BBS instructions.)*

Letters may be edited for space and clarity.



TRUE SYSTEMS MANAGEMENT DETECTIVE STORIES

SPECIAL ENTERPRISE-WIDE ISSUE !!!

INSIDE:

- THE MYSTERY OF THE GLASS HOUSE. Some said the jig was up. But they were wrong.
- THE TANGLED WEB OF NETWORKING. Where one false move could mean curtains.
- THE SCRAMBLED STANDARDS CAPER. Too many suspects. Too few answers.
- THE CASE OF THE NEBULOUS CLIENT-SERVER. Did the butler do it? Or the host?

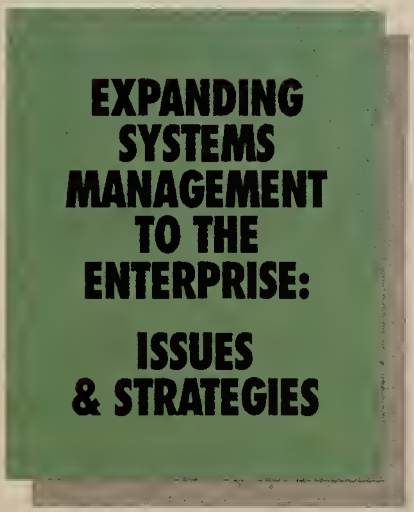
A LEGENT PUBLICATION

LEGENT

LEGENT CRACKS THE ENTERPRISE SYSTEMS MANAGEMENT CASE.

First, it was the centralized mainframe pushing around a bunch of dumb terminals. That caper you could handle in your sleep.

Then a bunch of standalone PCs and midranges blew in. But for the most part, they were someone else's problem.



EXPANDING SYSTEMS MANAGEMENT TO THE ENTERPRISE:

ISSUES & STRATEGIES

But now they're connecting those different platforms on LANs, and they want those LANs connected to the mainframe. And they're dumping the case right in your lap.

Sure, you can handle it. But having a little help wouldn't hurt. And that's where Legent comes in.

Some people call it distributed computing. Or cooperative processing. Or client-server. Either way, to some, it spells the death of the mainframe.

We don't agree.

We see the role of the mainframe changing as new platforms, technologies and processes are implemented and added.

We see exciting opportunities for enterprise systems management to help you advance your corporate goals, and we see the role of the data center professional emerging as more important than ever before.

We at Legent have written a special research report that spells out how we see the future of enterprise information systems, and the challenges and issues to be dealt with. It explains how the traditional disciplines and goals of systems management can be applied to heterogeneous computing environments, allowing you to create and manage true enterprise-wide systems.

It's a document that we think will be of major interest to every information systems professional.

To receive your personal copy, call **1-800-676-LGNT, Ext. 56.** And we'll be happy to throw the book at you.

LEGENT

Circle Reader Service #117

LEGENT

DATACOM

BUYER'S GUIDE

X.25 SWITCHES

Vendors aim to transform X.25 switches

Emergence of frame relay and ATM forces X.25 equipment makers to create hybrid packet/circuit switches.

With all the attention emerging technologies such as frame relay and Asynchronous Transfer Mode are garnering, X.25 equipment vendors must feel like the main characters in the movie *Wayne's World* when they dropped to their knees and cried, "We are not worthy!"

X.25 is very much alive and worthy, as evidenced by the users that continue to buy such products. Nevertheless, vendors believe the X.25 market has peaked, and they are preparing for the future by weaving support for frame relay and circuit switching into their products.

That's not to say vendors are ignoring X.25 developments. At the high end and even the mid-range, vendors are trying to squeeze the last breath out of X.25 by pushing trunk port speeds beyond 64K bit/sec to T-1 and E-1 rates. The higher throughput rates supported by the 1988 version of the X.25 standard are making the technology more viable for local-area network internetworking.

According to Lawrence Mauceri, senior director of product planning for Hughes Network Systems, Inc., the need to support high-speed, LAN-to-LAN traffic over the enterprise network is one of the driving forces behind the increased data rates.

Another trend is that increasingly, X.25 users are seeking access to X.25 networks via remote terminals on LANs, a requirement that will drive the movement toward faster packet switches capable of supporting LAN interconnectivity.

In addition, users are adopting a common strategy to migrate from X.25 to frame relay backbones, although many vendors believe frame relay will serve as a complementary protocol to X.25, not as a replacement.

"The pure X.25 network will go away, and a combination of frame relay and X.25 will serve as access technologies, with the backbone utilizing high-speed frame relay links," Mauceri says.

Some vendors claim that X.25 remains the dominant technology in the global interconnectivity market. The worldwide recognition of the standard and widespread support among foreign carriers will sustain X.25's longevity. The relatively low quality of many foreign transmission systems' infrastructures will require multinational network users to depend on X.25 because of its error detection and correction functionality.

Market trends aside, users looking to purchase X.25 packet switches should look at a wide range of factors that influence their equipment selection. In addition to assessing the cost and capabilities of the packet switches, users should examine such factors as physical interfaces, the number of available ports and the processing architecture. Maximum throughput and the number of virtual circuits supported are critical factors, too, as is net management support.

Beyond providing information about the X.25-related capabilities of the switches, this Buyer's Guide also discusses vendors' plans to incorporate new switching protocols, particularly frame relay, into their products. Users planning to implement an X.25 network should examine vendors' frame relay and other internetworking plans so they can assess whether a product purchased for X.25 purposes today will support other technologies in the future. The accompanying chart contains information on 70 packet-switched products from 25 vendors.

Switch sizes

One of the key factors in choosing a packet switch depends on the size of a company's network. Obviously, the more trunks and circuits required to support the network, the larger the packet switches needed. There are three size classes of X.25 packet switches: Small packet switches support fewer than 100 trunk and access ports; midsize switches support between 100 to about 1,000; while large packet switches support more than 1,000 such ports.

Of the products listed in the chart, most fall into the small packet switch category, including switches manufactured by Amnet, Inc., Ascom Timeplex, Inc., Dowty Communications, Inc. and Micom Communications Corp. Several vendors offer midsize switches, including NCR Corp., Racal-Datacom, Inc. and Telematics International, Inc., while others such as Ericsson Business Communications, Inc., Hughes Network Systems, Netrix Corp. and Sprint Corp. offer large packet switches.

Typically, large corporations may use high-end packet switches at a handful of sites, with smaller units at the majority of installations. However, many users today are not buying large

By JONATHAN BRANSKY and DEAN WOLF

Guide for choosing between frame relay, X.25

Users have been examining frame relay as an alternative approach for network switching and debating when it should be deployed instead of X.25. Users can follow some basic guidelines for deciding between frame relay and X.25.

Currently, frame relay is one of the most widely talked about networking interfaces in the industry. The frame relay interface can be thought of as a streamlined version of X.25. By relying on the quality of the transmission media and the intelligence of the end-user equipment, frame relay includes less protocol overhead for error detection than X.25.

Frame relay provides high-speed, low-delay transmission facilities. It can transparently transport protocols across the network at speeds as high as T-1, whereas the upper limit for most X.25 products is 64K bit/sec.

When deciding between X.25 and frame relay, users should consider the latter as the transmission interface when high throughput is required. Vendors that provide both frame relay and X.25 products report that frame relay networks offer as much as 10 times the throughput of X.25 networks. Furthermore, network managers trying to choose between the two should keep in mind that both technologies are designed to accommodate bursty traffic effectively.

In addition, both frame relay and X.25 packet switching have inherent traffic and congestion control mechanisms. However, except for the high-end X.25 switches, network delay introduced by the X.25 packet switch may be significant due to the increased processing required at each network node.

If transmission line quality is not a factor, then network managers should consider frame relay. However, if line quality is suspect — as is often the case when using international data transmission facilities — X.25 should be considered because of its robust error-checking facilities.

If an organization is building an international network, it should seriously investigate the quality of the transmission facilities available before deciding between X.25 and frame relay. Further, while U.S. carriers have built excellent networks overall, transmission quality in some portions of this country is not consistently good and may impinge on the advantages offered by frame relay.

One limiting factor for frame relay is that the protocol still does not include an internetwork gateway function similar to X.75, which supports connections of different X.25 nets. Therefore, a frame relay network must currently be based on one vendor's implementation of the frame relay interface standard because users have no assurance that two networks will interoperate.

Clearly, X.25 remains an appropriate choice particularly when transmission quality is questionable or when throughput requirements are not as great.

X.25 packet switching remains a useful technology capable of meeting current networking requirements. New technologies such as frame relay or Asynchronous Transfer Mode will be required as the need for greater throughput grows in response to applications, such as imaging and multimedia.

The vendors of packet switches clearly recognize this trend and some have already developed frame relay interfaces for their packet switches. Most of those that have not developed frame relay products have plans to do so. Therefore, users planning to migrate in the future to frame relay or another internetworking technology should understand their vendors' product direction.

— Jonathan Bransky and Dean Wolf

packet switches, but rather, are opting for service providers for that level of functionality as companies shift from a fixed to a variable cost structure.

Packet rates

The packet switch size is related to other characteristics, such as packet throughput and price. We asked vendors to provide packet throughput data using the assumptions that a packet into the switch and a packet out of a switch counts as one packet, and the size of the packet is equal to 128 bytes.

Users evaluating X.25 packet switches should ask vendors how they measure packet throughput because not all vendors use the same set of throughput assumptions. For example, some vendors consider a packet received by the switch and the same packet being sent out of a different switch port as two packets, thus doubling the switch's packet throughput rate. Based on the survey assumptions, large switches have packet throughputs greater than 10,000 packet/sec, while the small and midsize switches have throughputs between 50 and 5,000 packet/sec.

In the chart, throughput ranges from 45 packet/sec for NCR's Starwan 5481-10 to 26,880 packet/sec for NEC America, Inc.'s IX AP220.

In addition to packet throughput rates, buyers should examine data rates on trunk and access ports. The chart indicates that the maximum trunk data rates typically range from 64K to 2.048M bit/sec. On the local access port side, data rates range from 19.2K bit/sec to T-1/E-1 rates.

Hardware architecture

Most packet switches use a hardware architecture that is proprietary to the switch. However, several switches on the market, including those from Amnet, Franklin Datacom, Inc., Microtronix Datacom, Ltd. and NEC America, are based on a microcomputer architecture.

By using such an architecture, the switch vendor can provide respectable packet throughput — about 1,000 packet/sec — at a low cost. Also, microcomputer-based packet switches can be upgraded more easily to newer, faster processors than minicomputer-based packet switches.

Most packet switches use a distributed processing architecture as opposed to a centralized processing one within the switch. Vendors use a distributed hardware architecture to provide more efficient and reliable packet switches. Instead of relying on a single processor to handle the load, the distributed processing architecture divides switching functions across many processors for handling protocol errors and routing functions, for instance.

An example of the resiliency of a distributed processing architecture is if one line card fails, the whole packet switch does not likewise fail. However, because not all switches use the same distributed processing architecture, users must examine each packet switch on a case-by-case basis.

Most of the vendors surveyed offer at least one model that has an integrated packet assembler/disassembler, which converts a user's terminal equipment protocol to X.25. Integrated PADs usually consist of a card loaded into the packet switch. The advantage of using a switch with an integrated PAD is that it can help cut down on network equipment costs. In addition, they support all of the features that a stand-alone PAD would provide.

Packet switch vendors generally provide PADs that support asynchronous, Binary Synchronous Communications and synchronous data-link control protocols.

Only a few vendors support other protocols, such as Uniscope or polled asynchronous.

Interfaces

Another key buying factor is physical interface support. All the packet switches in the chart support RS-232 interfaces, and most of them also support V.35 interfaces. Dowty Communications PSX 8225 and Franklin Datacom's Franklin Datacom MPP are two products that don't offer V.35 support.

The chart also lists packet switch support for X.21, T-1/E-1 and RS-449, to name a few interfaces.

In addition to data on physical interfaces, the chart includes vendors' stances on frame relay support. Thirty-nine of the 70 switches listed in the chart support the frame relay network protocol. A few vendors that do not support frame relay — including Franklin Datacom, Micom and Unysinc, Inc. — plan to provide the capability by next year.

In last year's X.25 switch Buyer's Guide, very few vendors supported frame relay, but several had frame relay support under development.

However, unlike the situation with integrated PADs, not all of the X.25 packet switch manufacturers sell frame relay assemblers/disassemblers, devices that convert local data from native protocols into frame relay frames.

The interfaces supported depends largely on the number of ports offered on the packet switch. In the charts, several vendors, including Futurecomms, Inc., NCR and OST, Inc., offer devices with as few as six trunk ports. At the other extreme, Ericsson Business Communications and Sprint offer as many as 1,500 and 2,000 trunk ports, respectively. On the local access side, users can receive as few as two ports and as many as 2,000.

Network protocols

Like physical interfaces and frame relay support, net protocol support is a significant factor when choosing a packet switch. If it is important for your X.25 private network to communicate with another X.25 net, either private or public, then you should consider purchasing a product that supports X.75.

Only 16 of the 25 vendors participating in the survey, including Amnet, BBN Communications Corp., NCR, Teleglobe, Inc. and Telematics, support the international X.75 standard for linking X.25 packet-switched networks. This lack of support for the X.75 standard is surprising considering the importance of network-to-network interconnection and the increasing requirements for interenterprise data communications in today's networking environment.

Very few vendors surveyed offer support for the display system protocol (DSP), the de facto standard for transporting BSC terminal traffic over an X.25 backbone. Only switches from BBN Communications, Ericsson Business Communications, NCR, Telematics and Unisync support DSP.

Integrated switching

In addition to a wide degree of protocol support, vendors are increasingly offering integrated packet/circuit switching in their equipment.

For years, Netrix has offered integrated circuit and packet switching within its #1-Integrated Switching Sys-

(continued on page 54)

Your free guide to all the places Pacific Bell can transport your data.

Venice, California or Italy. Richmond, California or Virginia. San Jose, California or Costa Rica.

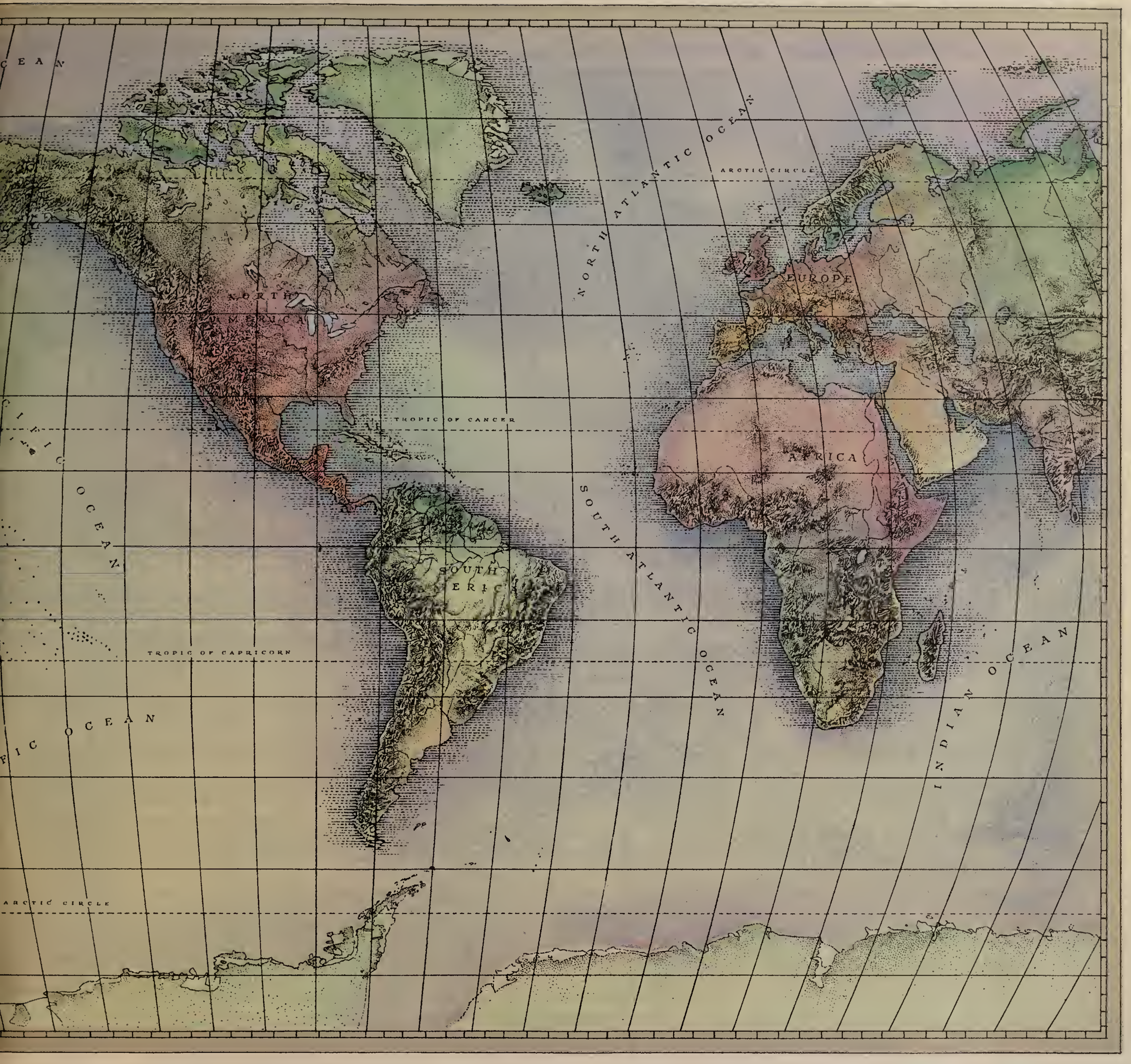
The fact is, no matter where on earth you need to move your data, Pacific Bell is the perfect place to start.

Call us first, and we can help you every step of the way—planning, installing, implementing and maintaining your data network. And to keep it all moving smoothly, you'll have your own Pacific Bell account team to rely on: a group of experts dedicated to your business, and well-versed in every aspect of data communications.

With them comes the latest in technology, designed

A PACIFIC TELESIS COMPANY

©1992 Pacific Bell



to handle whatever your business needs today—or will need tomorrow. Be it basic data transport, LAN interconnection, video teleconferencing, you name it.

And whether your data has to travel statewide, nationwide or worldwide, it will be handled in typically efficient, reliable, Pacific Bell fashion. (For connections beyond your service area, we'll coordinate service with your long distance carrier.)

So why not contact your Pacific Bell Account Executive or Authorized Sales Representative, or call 1-800-622-0735, extension 207.

We'll be happy to map out a plan for your success.

PACIFIC BELL.
Data Communications Group
Telesis℠ Products and Services

X.25 packet switches

Company	Product	Physical interfaces								Maximum ports		Maximum data rate (bit/sec)		Processing architecture	Network protocols							Virtual circuits		Maximum through-put (packet/sec)	Frame relay support		Management	Price
		RS-232	X.21	V.35	T-1/E-1	RS-449	V.11	RS-422/423	Other	Trunk	Access	Trunk	Access	C = Centralized D = Distributed H = Hybrid	X.21 (1980)	X.21 (1984)	X.25 (1988)	X.75	Display system protocol	Frame relay	Other	X.25	Frame relay	128-byte packets	Data communications equipment	Data terminal equipment	C = Common Management Information Protocol N= IBM's NetView O = HP's OpenView P = Proprietary S = SNMP	Maximum configuration
Amnet, Inc. (800) 846-2001	Nucleus 7200 Multiprotocol Switching PAD	✓		✓		✓			✓	32	64	2.048M	256K	D	✓	✓				✓		2,000	2,000	1,000	✓	✓	P, S	$26,800
	Nucleus 7400 Network Switch	✓	✓	✓	✓	✓		✓	✓	64	64	2.048M	256K	D	✓	✓		✓		✓		264	264	1,200	✓	✓	P	$35,000
	Nucleus 7500 Network Switch	✓	✓	✓	✓	✓		✓	✓	64	64	2.048M	256K	D	✓	✓		✓		✓		2,000	2,000	1,200	✓	✓	P	$38,500
Ascom Timeplex, Inc. (800) 669-2298	TimePac NP100E	✓	✓	✓		✓	✓	✓		20	20	64K	64K	D		✓				✓		20,000	80	120		✓	P	$9,000
	TimePac NP500	✓	✓	✓		✓	✓	✓		28	28	128K	128K	D		✓				✓		28,000	112	500		✓	P	$40,000
	TimePac NP1000	✓	✓	✓		✓	✓	✓		28	28	256K	128K	D		✓				✓		28,000	112	1,000		✓	P	$50,000
BBN Communications Corp. (617) 873-3268	T/10	✓	✓	✓	✓	✓		✓		48	48	2.048M	2.048M	D	✓	✓	✓		✓		✓	5,000	NA	(1)			P	$15,000
	T/300	✓	✓	✓	✓					14	99	2.048M	2.048M	D	✓	✓	✓	✓		✓		14,000	NA	(1)		✓	P	$150,000
	C/300	✓	✓	✓		✓		✓		14	63	64K	64K	D	✓	✓		✓				1,200	NA	(1)			P	$100,000
	C/33	✓	✓	✓		✓		✓		12	23	64K	64K	D	✓	✓						1,200	NA	(1)			P	$100,000
Dowty Communications, Inc. (415) 508-2500	PSX 8225	✓					✓			9	9	64K	19.2K	C	✓	✓						256	NA	50			P	$5,100
	PSX 8325	✓	✓	✓			✓			24	24	256K	256K	C	✓	✓	✓	✓		✓		1,024	1,023	200	✓	✓	P	$22,000
Dynatech Communications, Inc. (800) 727-7215	CPX-20	✓	✓	✓	✓	✓	✓	✓	✓	40	40	2.048M	2.048M	D			✓			✓	✓	2,048	256	3,000	✓	✓	P, S	$19,450
	CPX-10	✓	✓	✓	✓	✓	✓	✓	✓	40	40	2.048M	2.048M	D			✓			✓	✓	2,048	256	3,000	✓	✓	P, S	$19,450
	CPX-432	✓	✓	✓	✓	✓	✓	✓	✓	40	40	2.048M	2.048M	D			✓			✓	✓	2,048	256	3,000	✓	✓	P, S	$19,450
EDA Instruments, Inc. (416) 425-7800	Micron Switch	✓	✓	✓			✓	✓		8	8	128K	19.2K	D	✓	✓	✓					2,000	NA	600			P	$5,000
	FRX Switch	✓	✓	✓	✓					80	80	2.048M	2.048M	D	✓	✓	✓	✓				327,600	NA	4,500				$100,000
	MPX 25000	✓	✓	✓			✓	✓	✓	32	64	128K	19.2K	D	✓	✓	✓					8,000	NA	2,400			P	$30,000
Ericsson Business Communications, Inc. (201) 319-3350	EriPax	✓	✓	✓	✓		✓			1,500	1,500	2M	256K	D	✓	✓	✓	✓	✓	✓	✓	10,000	3,700	15,000	✓	✓	P, N	$10,000
Franklin Datacom, Inc. (805) 373-8688	Franklin Datacom MPP	✓			✓					4	8	2M	2M	D		✓						255	NA	200			P, S	$2,795
Futurecomms, Inc. (301) 662-5926	Pico Turbo	✓		✓						3	2	512K	256K	C		✓	✓	✓		✓		900	900	950	✓	✓	P	$2,000
	Nano Turbo	✓		✓						6	5	64K	19.2K	C		✓	✓			✓		560	560	140	✓	✓	P	$2,895
	Micro Turbo II	✓		✓						13	12	512K	256K	D		✓	✓	✓		✓		2,048	1,024	1,164	✓	✓	P	$6,500
	Micro Turbo	✓								10	9	19.2K	19.2K	C		✓	✓	✓		✓		284	284	70	✓	✓	P	$3,395
	Pac.25 Turbo	✓		✓		✓		✓		42	40	64K	64K	D		✓	✓	✓		✓		1,024	1,024	490	✓	✓	P	$16,000
Gandalf Systems Corp. (609) 424-9400	Access 2590	✓		✓	✓		✓	✓		4	5	2M	10M	C	✓	✓	✓			✓		250	250	5,000	✓	✓	P, S	$11,995
Hughes Network Systems, Inc. (301) 601-4045	Strategy	✓		✓		✓			✓	768	No limit	2M	2M	D	✓	✓	✓	✓		✓		12,288	16,256	12,000	✓	✓	P, N, S	$960,000
Micom Communications Corp. (800) 642-6687	MB3-PSW	✓	✓	✓		✓	✓	✓		12	12	72K	72K	C		✓						128	NA	100			P	$4,305
	MB3000-PSW	✓	✓	✓		✓	✓	✓		18	18	72K	72K	C		✓						255	NA	300			P	$6,950
	MBE	✓	✓	✓	✓	✓	✓	✓	✓	72	72	2.048M	2.048M	H		✓	✓					2,000	NA	1,500			P	$80,000
Microtronix Datacom, Ltd. (519) 659-9500	CSI-X.25 Switch	✓	✓	✓						18	17	64K	19.2K	C	✓	✓					✓	255	NA	100			O	$7,000
Motorola Codex (508) 261-4000	Codex 6525 Packet Switch	✓	✓	✓						54	53	80K	80K	D	✓	✓				✓	✓	2,000	1,728	1,000		✓	P, N	$37,270
	Codex 6507 Multi-Function PAD	✓	✓	✓						2	23	80K	80K	D	✓	✓				✓	✓	2,000	64	300		✓	P, N	$13,925
NCR Corp. (800) 237-8526	Starwan 5480-5000 Switch	✓	✓	✓	✓	✓			✓	448	448	2.048M	256K	D	✓	✓	✓	✓	✓	✓	✓	10,000	NA	2,000	✓		P	$68,000
	Starwan 5480-5000 NCC	✓	✓	✓	✓	✓			✓	448	448	2.048M	256K	D	✓	✓	✓	✓	✓	✓	✓	10,000	NA	2,000	✓			$81,000
	Starwan 5480-4000 Switch	✓	✓	✓	✓	✓			✓	480	480	2.048M	256K	D	✓	✓	✓	✓	✓	✓	✓	10,000	NA	1,200	✓		P	$40,000
	Starwan 5480-4000 NCC	✓	✓	✓	✓	✓			✓	480	480	2.048M	256K	D	✓	✓	✓	✓	✓	✓	✓	10,000	NA	1,200	✓		P	$53,000

X.25 packet switches

Company	Product	Physical interfaces								Maximum ports		Maximum data rate (bit/sec)		Processing architecture	Network protocols							Virtual circuits		Maximum through-put (packet/sec)	Frame relay support		Management	Price
		RS-232	X.21	V.35	T-1/E-1	RS-449	V.11	RS-422/423	Other	Trunk	Access	Trunk	Access	C = Centralized D = Distributed H = Hybrid	X.21 (1980)	X.21 (1984)	X.25 (1988)	X.75	Display system protocol	Frame relay	Other	X.25	Frame relay	128-byte packets	Data communications equipment	Data terminal equipment	C = Common Management Information Protocol N= IBM's NetView O = HP's OpenView P = Proprietary S = SNMP	Maximum configuration
NCR (continued)	Starwan 5480-400 Switch	✔		✔					✔	48	48	256K	79.2K	C	✔	✔	✔	✔	✔		✔	5,000	NA	500	✔		P	$23,000
	Starwan 5480-400 NCC	✔		✔					✔	48	48	256K	79.2K	C	✔	✔	✔	✔	✔		✔	5,000	NA	500	✔		P	$27,000
	Starwan 5480-240 Switch	✔	✔	✔		✔			✔	32	32	64K	64K	C	✔	✔	✔	✔	✔		✔	5,000	NA	400		✔	P	$15,937
	Starwan 5480-240 NCC	✔	✔	✔		✔			✔	32	32	64K	64K	C	✔	✔	✔	✔	✔		✔	5,000	NA	400		✔	P	$19,800
	Starwan 5481-53	✔	✔	✔			✔	✔		24	32	64K	19.2K	C	✔	✔			✔		✔	1,200	NA	450			P	$10,800
	Starwan 5481-52	✔		✔			✔	✔		12	32	64K	19.2K	C	✔	✔			✔		✔	1,200	NA	250			P	$7,200
	Starwan 5481-40	✔		✔			✔	✔		16	27	64K	19.2K	C	✔	✔			✔		✔	1,200	NA	225			P	$7,200
	Starwan 5481-20	✔		✔			✔	✔		10	16	64K	19.2K	C	✔	✔			✔		✔	1,200	NA	125			P	$6,700
	Starwan 5481-10	✔		✔			✔	✔		6	5	64K	9.6 K	C	✔	✔			✔		✔	480	NA	45			P	$3,700
NEC America, Inc. (800) 623-3349	IX AP220	✔		✔	✔	✔		✔	✔	48	48	1.544M	1.544M	D		✔	✔			✔	✔	98,304	1,536	26,880	✔	✔	P, C,S	$88,450
Netrix Corp. (703) 742-6000	#1-ISS	✔	✔	✔	✔		✔			(2)	(2)	2M	2M	D	✔	✔	✔	✔		✔		42,000	42,000	10,000	✔	✔	P	$1,000,000
Northern Telecom, Inc. (800) 667-8437	DPN-100	✔	✔	✔	✔					210	208	2.048M	2.048M	D	✔	✔	✔	✔		✔		57,192	6,096	3,800	✔		S, N	$181,000
OST, Inc. (703) 817-0400	Ecom 25M	✔	✔	✔			✔			72	71	64K	64K	D		✔		✔				1,152	NA	1,000				$33,825
	Pass 25E	✔	✔	✔			✔			6	5	64K	64K	C		✔		✔				256	NA	160			P	$3,380
	Pass 25	✔	✔	✔			✔			16	17	64K (X.25), 256K (FR)	64K	C		✔		✔		✔		512	8	160		✔	P	$7,750
	Ecom 25L	✔	✔	✔			✔			24	23	64K	64K	D		✔		✔				384	NA	600			P	$13,450
	Ecom-IS 24	✔	✔	✔			✔		✔	24	23	64K (X.25), 512K (FR)	64K	D		✔		✔		✔		1,536	8	720		✔	P	$16,030
	Ecom-IS 72	✔	✔	✔			✔		✔	72	71	64K (X.25), 512K (FR)	64K	D		✔		✔		✔		4,608	24	1,700		✔	P	$39,300
Racal-Datacom, Inc. (305) 846-1601	RCP-FRM	✔	✔	✔		✔		✔	✔	40	40	2M	2M	D		✔		✔		✔		250,000	250,000	10,000	✔	✔	P, S	$48,165
	Series 300	✔		✔			✔			114	120	72K	10M	D	✔	✔						5,300	NA	700			P, S	$100,000
Sprint Corp. (703) 689-6000	TP4900	✔	✔	✔	✔		✔		✔	2,000	2,000	2.04M	2.04M	D	✔	✔	✔	✔		✔	✔	10,000	6,000	20,000	✔	✔	P, S, C	$100,000
	TP4800	✔		✔						224	224	64K	64K	D	✔	✔		✔			✔	2,400	NA	4,000			P	$75,000
	TP8000	✔	✔	✔			✔			16	16	64K	64K	D	✔	✔	✔	✔				500	NA	400			P	$14,000
Telefile, Inc. (800) 854-3128	Tele-Switch Plus	✔	✔	✔	✔	✔	✔	✔	✔	340	340	2.048M	2.048M	D	✔	✔	✔	✔		✔		20,000	20,000	7,000	✔		P, S, N	$158,000
Teleglobe, Inc. (formerly Memotec) (214) 934-1219	MP9700	✔	✔	✔		✔		✔	✔	54	54	128K	128K	D	✔	✔	✔	✔			✔	2,000	NA	230			P	$36,995
	MP9500	✔	✔	✔		✔		✔	✔	54	54	128K	128K	D	✔	✔	✔	✔			✔	5,000	NA	270			P	$49,845
	SP9800	✔	✔	✔		✔		✔	✔	10	10	1.024M	1.024M	D		✔	✔			✔		728	256	800	✔	✔	P	$14,200
Telematics International, Inc. (305) 772-3070	ACP 10	✔		✔		✔	✔	✔		1	5	64K	19.2K	C			✔	✔	✔	✔	✔	1,024	1,024	100		✔	P	$1,800
	PCP 240	✔		✔		✔	✔	✔		4	28	256K	256K	C		✔	✔	✔	✔		✔	4,000	4,000	500			P, C, S	$12,750
	PCP 400	✔		✔	✔	✔	✔	✔		38	50	2.048M	512K	C		✔	✔	✔	✔	✔	✔	6,000	6,000	600	✔	✔	P, C, S	$14,500
	PCP 4500	✔		✔	✔	✔	✔	✔		64	440	2.048M	2.048M	D		✔	✔	✔	✔	✔	✔	10,000	10,000	1,500	✔	✔	P, C, S	$29,000
	PCP 5600	✔		✔	✔	✔	✔	✔		64	440	2.048M	2.048M	D		✔	✔	✔	✔	✔	✔	10,000	10,000	2,500	✔	✔	P, C, S	$52,500
Unisync, Inc. (714) 985-5088	Unibridge	✔	✔	✔		✔	✔	✔	✔	28	52	2M	2M	D	✔	✔	✔		✔		✔	1,024	NA	1,000			P	$18,000

(1) BBN was unable to provide this information.
(2) Netrix's #1-Integrated Switching System (ISS) has a combined total of 4,000 trunk and access ports.

FR = Frame relay
NA = Not available

SOURCE: ERNST & YOUNG, VIENNA, VA

NATIONAL KNOWS NETWORKING

In fact, National is the only silicon supplier to offer solutions across all three major networking standards: Ethernet, Token Ring, and FDDI. We know the market demands improved connectivity, performance, quality, **INTEROPERABILITY** and network management. And at National Semiconductor, we're providing market-driven mixed analog + digital silicon solutions to make all this a reality. Our first **ETHERNET** silicon helped foster the worldwide acceptance of LANs. In fact, well over 13 million Ethernet adapter cards have been designed using National's silicon — more than all other suppliers combined. National's ST-NIC™ was the first single-chip **10BASE-T** controller to put 10Mbps Ethernet on standard unshielded twisted pair wire. And our newest 16- and 32-bit solutions are making the first "Network Ready" PCs, MACs and peripherals a reality. National is also developing solutions to simplify the role of **NETWORK MANAGEMENT.** Our Product of the Year Award-winning RIC™ + SONIC™ chipset is the first to fully support the IEEE 802.3 mandatory and optional repeater management requirements. We're

THE NATIONAL

also creating silicon solutions to ensure full interoperability of **MIXED MEDIA** and multiple protocol environments and to deliver new desktop services and applications. We've joined efforts with IBM, the leader in Token-Ring technology, to make it easier for your customers to seamlessly connect Ethernet and **TOKEN-RING** protocols. And we recently introduced TROPIC™, the industry's first fully-integrated single-chip Token-Ring controller. That's just the first step in a joint IBM-National relationship that will deliver new levels of flexibility to the world of networking.

STANDARD.

National is also providing new levels of performance with breakthroughs like **100BASE-T™** technology and our upcoming 2-chip FDDI solution. 100BASE-T is the first silicon solution proposed for **FDDI** across twisted pair copper wire. These solutions will drive affordable FDDI performance to the desktop. We're supplying proven "National Standard Silicon" today. And together we're **SETTING THE STANDARDS** that will take you where networks are going in the future. For more information, give National a call at **1-800-NAT-SEMI (Ext 191).** We'll show you why no one knows networking like National Semiconductor.

©1992 National Semiconductor Corporation.

National Semiconductor

(continued from page 47)

tem (ISS), and now new players have entered this field. Vendors supporting this feature are Amnet, Franklin Datacom, Motorola Codex, Northern Telecom, Inc. and Unisync.

This hybrid switching system uses packet switching at the source and destination nodes, and circuit switching between nodes within the net. Integrated switching enables users to employ the best switching technology for each net application while using the same packet switch. Integrated packet/circuit switching is especially useful for the transport of Systems Network Architecture traffic over an X.25 net.

Net partitioning, addressing

Another important factor in choosing packet switches is network partitioning, a security feature that provides the ability to restrict user access to services and ports on an X.25 network. Two net partitioning options that X.25 packet switches support are closed user groups, which restrict user access to specific ports on the network, and access groups, which determine the services a user may access on the network.

"There are several reasons for partitioning an X.25 network," says Tom Brophy, manager of carrier and value-added network services for UPS Telecommunications, Inc., a subsidiary of United Parcel Service of America, Inc. "A large multinational corporation might want to partition separate subdivisions or applications, or provide regional management capabilities."

CCITT X.121 format is the addressing standard that X.25 packet-switched networks employ. X.25 packet switches can support multiple addressing options, including hunt groups, station-to-station addressing and subaddressing. Hunt groups allow a single host on the network to be connected to multiple ports, while station-to-station addressing supports communications from one point on the network to another without intervention. Subaddressing uses a suffix to a user's network address to specify, among other things, a class of service within the system.

All of the switches in the Buyer's Guide support a subset of the above X.25 network partitioning and addressing options, with most switches supporting all of the above options.

Managing the packet net

Network management is also an important consideration when buying any piece of networking equipment, packet switches included. All vendors responding to the survey offer a network management system. However, most of the vendors support only their own proprietary management system. Ericsson Business Communications, Hughes Network Systems, Motorola Codex, Northern Telecom and Telefile, Inc. also provide users with IBM NetView interfaces for managing their switching products.

Even though standards-based network management has been a hot topic since the late 1980s, only three vendors — NEC, Sprint and Telematics — support Open Systems Interconnection-based network management and the Common Management Information Protocol (CMIP)/Common Management Information Services protocol.

Interestingly, less than a quarter of the packet switches in the Buyer's Guide support the Simple Network Management Protocol, the de facto network management protocol standard. Vendors that support SNMP include Amnet, Dynatech Communications, Inc., Franklin Datacom, Gandalf Systems Corp. and Racal-Datacom.

SNMP has been widely accepted and implemented by many vendors of nearly all network equipment types.

"SNMP is important as an access management protocol for networking equipment to help eliminate the need for proprietary management protocols," says UPS Telecommunications' Brophy. The lack of widespread SNMP and CMIP support limits users' ability to integrate management of their X.25 network with other net management systems that may already be in place.

Wide price range

As with any equipment purchase, price is a factor. The list prices contained in the Buyer's Guide are for the maximum configuration possible. The different switch sizes are reflected in the broad price range — $2,000 for Futurecomms' low-end Pico Turbo to $1,000,000 for Netrix's #1-ISS, which offers integrated packet/circuit switching.

Due to such a wide range in pricing and vendors' varied mix of standard features and options, buyers should carefully review their current and future application and traffic requirements to determine how long X.25 will be able to meet their networking needs. ◼

Bransky is a consultant and Wolf is a senior manager for Ernst & Young's Network Strategies Practice in Vienna, Va.

What are VSAT users saying about AT&T Tridom?

Consistent performance in all categories propelled AT&T Tridom to the top spot in this DATA COMM User Survey. The company's VSAT network offering placed first in eight of the 16 technical and service categories. AT&T Tridom earned its highest marks for network reliability and availability, its support for different data types and protocols, and the quality of its technical help and installation efforts.

The company (AT&T Tridom) is better positioned than other vendors to build networks that combine VSAT technology with AT&T terrestrial high-speed point-to-point links. Another strength is its shared hub service capability. Although Tridom has less shared hubs than its competitors, the three hubs are all located at AT&T central offices, providing greater sophistication of control and reliability than that of its competitors.

AT&T Tridom rated tops in five out of eight technology categories. It was the only vendor to achieve a rating of more than 3.0 for its ability to integrate with other network management systems. The vendor also earned high marks for the quality of its diagnostic features and performance monitoring tools.

At AT&T Tridom, there is nothing more important than standing by our customers — and it shows.

It shows in the 1992 *I/S Brand Preference* survey on wide area networks conducted by *Computerworld* where AT&T Tridom swept five categories including *Best Technology, Best Price/Performance, Best Service/Support, Best Documentation,* and *Prefer to Do Business With.*

It shows in the 1992 *Users' Choice* survey conducted by *Data Communications* in which AT&T Tridom was voted the *Best Overall VSAT Vendor* with the *Best Technology.*

And it shows by what industry analysts are saying. A recent *Yankee Group* report lauded AT&T Tridom's shared hub service capability, technical superiority, and facility for combining VSAT technology with terrestrial data services.

These achievements have occurred for one simple reason: *We make it our business to be totally responsive to our customers' networking needs.*

Give us a call. 800-346-1174
404-426-4261, FAX: 404-514-1737

AT&T Tridom

Circle Reader Service #102

Public or private?

That is the question

Making the choice between public and private networking gets tougher as carriers build more functionality into the public network.

Private networking has reached a pinnacle and appears to be on the wane. Companies that installed private networks following divestiture are now dismantling large portions of them in favor of hybrid networks that mix the best of private and public networking together.

This trend emerged over the past few years as many users noticed that public network offerings could provide the same functions as private networks but at a lower cost. It wasn't so long ago that communications managers proudly proclaimed to senior management that they could cut costs by merging voice and data over T-1 circuits, thus eliminating separate voice and data networks.

But now, most users are finding that carrier-based virtual private networks can handle voice traffic more efficiently than private networks and have migrated voice traffic back to the public network. The bulk of traffic now running over private networks is data, and a growing amount of it is generated by such bursty applications as local-area network interconnection.

Carriers are now taking aim at those bursty data applications by offering high-speed public packet services, such as frame relay and Switched Multimegabit Digital Service (SMDS).

Where there are certainly more public options for carrying data traffic than ever before, the sparse availability of these newfangled data services is causing many users to stick with their private networks for now. Therefore, private networks are not dead yet.

While users are hesitant to give up private networks entirely, they don't want to miss out on the options available through the public network either.

"We're constantly evaluating the balance between virtual networking and private networks," says Chuck Ramey, manager of telecommunications network hardware for Rockwell International Corp. in Seal Beach, Calif. "There have to be compelling economic arguments to siphon traffic off an existing private net. And there have to be alternative means to support the rest of the network if the loss of that ruins the economies of the network as a whole."

It's really tough to say that any one application is best suited for public or private facilities. There are, however, some basic assumptions users can make when trying to decide to go public or private.

With its inherent redundancy and increasing transmission quality, the public network handles basic transport extremely well — far better for voice than for data at this point. But new data transport options such as frame relay and SMDS are improving data transport over the public net.

On the other hand, private networks provide economic and management benefits for mission-critical data applications. With leased lines, users pay a fixed fee for unlimited transmission, while switched service fees are largely based on connect time. Users also have much more control over leased lines, a key factor in securing data transmissions.

In some cases, private nets are a better option for voice, too. Data applications that require only a portion of leased-line capacity make it attractive to run voice over bandwidth that would otherwise go unused. In other cases, private lines can be used to support compressed voice, which makes it possible for users to squeeze more calls on a single circuit.

The raging debate

Given these and other differences between public and private networks, the debate over them runs throughout the communications industry. It can be heard in the offices of private branch exchange and multiplexer vendors as they devise strategies to combat the network-based functionality provided by Centrex. Likewise, carriers can be heard positioning public network services, such as virtual private networks, against private networks.

Lastly, users debate whether they should build totally owned and operated networks, using such equipment as microwave radio, or tap carrier services. Building entirely owned networks is becoming more difficult, due to the huge expense of obtaining available frequency and land for microwave transmission paths.

In the end, most users say the

(continued on page 56)

By DANIEL BRIERE

ILLUSTRATION ©1992 STEVE DININNO

(continued from page 55)

decision between public or private networking boils down to two main questions:

- **Which type of network can support your application(s)?** Built correctly, private nets can support nearly any application. With the advent of such services as virtual private networks, the public network is clearly offering many private network features. However, the public network doesn't yet offer an alternative to every private network application.
- **What will it cost?** Bottom-line costs are always important. If an application can be supported over both public and private networks, the question becomes, which one is more economical?

The more important question in this debate is whether the public network can support the functions a private network can.

When determining whether the public network can support an application, here are some key factors to consider:

- **Reliability.** Public nets are engineered to handle millions of calls — far above that of private networks. Thus, public networks have to be reliable. Carriers have high levels of redundancy built into their networks to provide that reliability. Getting even some semblance of public net reliability in private networks means users have to incur the cost of adding redundant circuits.

"Private nets have evolved to the point where they are very comparable [to public nets] in availability," says Rockwell's Ramey, adding that the public net does not have the competitive impact it had about five years ago when mesh private networking was more expensive.

- **Manageability.** Most users want to monitor their applications, particularly data applications, for such factors as error rates, uptime and traffic flows. These functions are not always provided by carriers.

AT&T, MCI Communications Corp., Sprint Corp. and WilTel each offer some sort of network management terminal that enables users to track network services, whether they are public services or leased lines used in private nets. But these public service management capabilities are still being developed and do not match those available from vendors of multiplexers used to anchor private networks.

- **Security.** Customers require a certain comfort level when it comes to making sure their confidential data is not flowing to a competitor's terminal. To a large degree, public net providers are dealing with security from a standards viewpoint. They are building such mechanisms as secure addressing into their data offerings to ensure customers that traffic can be transmitted only to a specific group of users, or a "closed user group."

Security is not as much of a problem in private networks because users can control data flows. Data in both public and private networks can be encrypted before transmission, thus providing a higher level of security.

Decision points

Deciding whether the public network can handle an application is indeed a major hurdle. But users don't want the public net to simply handle their application; they also want to retain control over the application.

So users must also consider whether the public network can provide the same functionality that is available with customer premises equipment. It used to be that PBXs offered a far greater range of features than Centrex. But years of development by central office switch vendors have brought these two competing technologies in line.

"Centrex can do almost anything a PBX can do these days," says Joe Gallo, a network services manager for The Santa Cruz Operation, Inc. (SCO), a software vendor in Santa Cruz, Calif. Gallo favors PBXs because they can be reconfigured more quickly. "Some Centrex changes can take two or three days to implement," he says. "New Centrex installations can take weeks."

Equipment vendors aren't rolling over and playing dead just because the public net is gaining in functionality. They're adding interfaces to new public network services or trying to build carrier network functions into their products.

Vendors of network access equipment are adding interfaces to switched data circuits. This makes it possible for some traditional private-net applications to be supported on the public network.

Take videoconferencing, for example. In the past, video transmission required high-speed private lines. New inverse multiplexers that spread a high-speed data stream across multiple dial-up 56/64K bit/sec circuits make it possible to establish video links over the public network.

Another traditional private net application that has hit the public network is virtual network ringdown circuits. With these circuits, a caller simply picks up a telephone and the network automatically routes the call to a predetermined location.

Private lines used to be the only option for these types of phones, used by car rental companies and hotels at airports, because of the requirement for fast call setup.

Today, the faster call setup time supported in the mostly digital and Signaling System 7-based public network allows for connection within two to three seconds. When the airport phone is picked up, for example, the public net automatically dials the car rental or hotel phone number. While still not as quick as private-line solutions, it is close enough for many communications managers to compare further.

The pros and cons of ACD options

A fine example of the type of application that can tear users between a private or public network is automatic call distribution (ACD).

Carriers claim they can use central office switches or adjunct processors to provide the same functions supported by ACDs such as Rockwell International Corp.'s Galaxy ACD or Northern Telecom, Inc.'s Meridian ACD. To help users weigh the pros and cons of a network-based or on-site ACD, consider a classic application in which 800 service calls are distributed among multiple call centers, depending on such criteria as time of day, day of week and agent availability.

Let's do it ourselves

In the premises-based scenario, calls come into an ACD that queries its call routing instruction database. Calls can then be sent to local agents or across a leased line to an ACD at another site.

This approach has several advantages. Users have direct control over where calls are sent. Calls can be routed through a private branch exchange, if desired. Many public net-based systems require Centrex or a direct connection between agents and a central office switch.

Premises-based ACDs let users manage staff resources better than public network or central office-based ACDs. For instance, premises-based ACDs provide real-time production-oriented management of call routing and agent staffing, allowing a manager to manipulate the call volume from agent group to agent group. Public network-based ACDs provide similar functionality, but not in as much depth.

Users have access to all features of premises-based systems, while users of public network-based ACDs are limited to the features the carrier has decided to tariff.

There are also a few drawbacks. A premises-based solution requires an expensive ACD at each site. Those ACDs have to be linked via leased line. In order to get redundancy, premises-based users have to buy additional ACDs, whereas public network-based solutions have redundancy built in.

Leave the call routing to us

In the public network-based scenario, calls are held in the public net until internal network signaling can determine the status of each agent group at each location to decide where the call should be sent.

There are advantages to this approach, as well. The public network is inherently more reliable than a private network due to its many alternate paths. Also, a single public network ACD can handle traffic destined for every call center.

Public network-based options reduce bandwidth needs by holding calls in the network until it is decided where the call is to be sent. Premises-based systems may require every call to be delivered to a customer site before determining if it must be routed elsewhere.

However, there also are drawbacks. For instance, control of public network ACD functionality is not as sophisticated as premises-based ACDs. Public network ACDs tend to view agents as single groupings, where premises-based ACDs can divide large groups into subgroups for more efficient and flexible call handling.

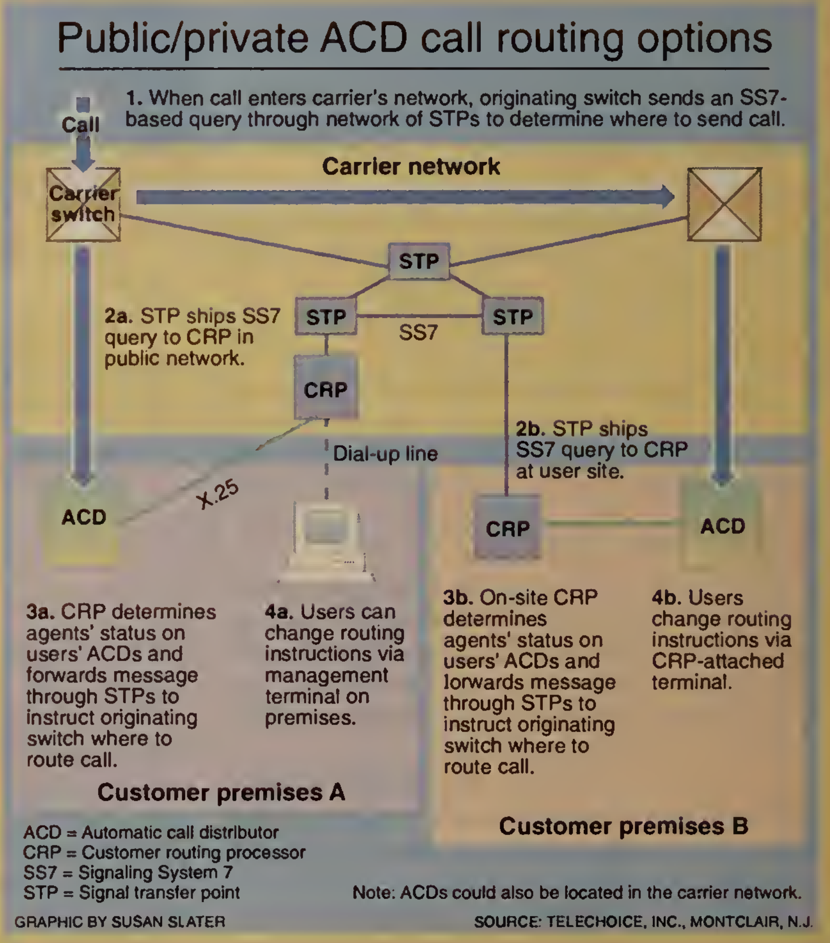
Public network-based ACDs are weak on technology integration. In today's call centers, calls may come into a voice response unit, such as when a caller wants to obtain a product price. To order the product, the caller has to transfer out of the voice response unit to an ACD. This function is better supported by premises-based equipment that has been tightly integrated.

Users may also need to establish a tight computer-to-public network switch link as easily as they can link ACDs to premises-based hosts.

Such a connection can determine where call routing information is stored (see graphic, this page). Users can implement a Signaling System 7 link to pass call routing instructions from an on-site customer routing processor (CRP) to the public net. Alternatively, a CRP in the public net can determine call routing.

"From a manufacturer's point of view, this is where the problems come in," explains Bob Buffington, manager of strategic planning for Rockwell International's Switching Systems Division in Downers Grove, Ill. "This ACD-to-CRP interface, regardless of whether it sits in the network or on the customer's premises, has not been defined." Consequently, a different interface may be needed for CRPs made by different vendors.

— Daniel Briere


Public/private ACD call routing options

1. When call enters carrier's network, originating switch sends an SS7-based query through network of STPs to determine where to send call.

2a. STP ships SS7 query to CRP in public network.

2b. STP ships SS7 query to CRP at user site.

3a. CRP determines agents' status on users' ACDs and forwards message through STPs to instruct originating switch where to route call.

4a. Users can change routing instructions via management terminal on premises.

3b. On-site CRP determines agents' status on users' ACDs and lorwards message through STPs to instruct originating switch where to route call.

4b. Users change routing instructions via CRP-attached terminal.

ACD = Automatic call distributor
CRP = Customer routing processor
SS7 = Signaling System 7
STP = Signal transfer point

Note: ACDs could also be located in the carrier network.

GRAPHIC BY SUSAN SLATER

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

The key selling points virtual ringdown circuits have over leased lines include reliability, usage-sensitive pricing and call records that can appear on the user's telephone bill. With this billing data, users can track peak calling times and call durations.

AT&T is looking at a number of enhancements that would allow its virtual ringdown product, SDN Express Connect, to eclipse private-line functionality. One enhancement is point-to-multipoint ringdown circuits, which would enable a user at a central site to pick up a phone and automatically dial multiple remote phones to set up a conference.

SS7: Let's plug and play

While the carriers would love it if everyone disconnected their private facilities and utilized only public services, this is unlikely to happen. However, there is a broad middle ground that is being prepared for sophisticated users. Carriers are working with equipment vendors to develop products that will enable users to tap directly into public carrier equipment and tightly interconnect private and public networks.

Carriers have long offered the ability to interconnect a private network to the public network via a private network interface. Usually this was nothing more than an access line linking the two. Calls could pass from one to the other, but even simple functions have been unavailable, such as passing site location codes that designate the private network site where the call originated to the public network for incorporation in billing.

Private network users that have some inherent equipment compatibility with the public net, such as a Northern Telecom, Inc. central office switch communicating with a Northern Telecom PBX-based net, often can share advanced features using proprietary signaling protocols.

But in most cases, the public network has been limited in its ability to see behind the interface. That is, the central office equipment has been unable to intercommunicate with the network to determine if a telephone on the private network was busy, for instance.

A number of interfaces have been investigated for enhancing this interconnection, including the Integrated Services Digital Network Primary Rate Interface (PRI), SS7, and Switch-to-Computer Application Interface (SCAI). Some vendors use X.25 to provide this interconnection.

Of these, SS7 interconnections are the newest. These links between customer premises and carrier networks allow messages between the network and customer premises equipment to check telephone status and reroute calls, among other things.

In late 1991, AT&T released SS7-interconnection specifications that detailed how customers could connect premises-resident computers to the carrier's network control point databases via SS7, allowing users to process calls faster and possibly more economically.

Users looking to implement these advanced connections, whether SS7, ISDN or SCAI, are going to have some philosophical decisions to make as to where they want their intelligence to reside (see "The pros and cons of ACD options," page 56).

ISDN connections are a different matter. There was a day when people talked about providing such customer premises-to-public network equipment signaling over an ISDN D-channel, instead of a direct SS7 or X.25 link.

But don't give up on ISDN yet. Each month, ISDN takes a step closer to being a viable reality for national applications — public and private alike. Sprint, for one, prefers to handle advanced signaling via ISDN PRI, according to Rob Belknap, manager of product planning and support for Sprint Government Systems.

Sprint recently completed a trial with BellSouth Telecommunications and the General Services Administration in which an ISDN PRI link tied the government's Federal Telecommunications System 2000 private network to a GSA Centrex service in Atlanta. The link supported establishment of a switched 64K bit/sec videoconference. It was the first time Sprint had taken ISDN to a Centrex switch.

AT&T just announced advanced signaling capabilities between its own net and customer premises-based equipment. In June, AT&T announced its Look Ahead Interflow for public network ISDN customers using AT&T Megacom 800 service, AT&T Software-Defined Network service and AT&T Communications System PBXs. This ISDN feature allows AT&T's Definity PBXs to use the carrier's SS7 network to route incoming 800 calls to alternate sites over SDN ("AT&T gives call centers SDN routing," *NW*, July 6).

Getting to the bottom line

With all the enhancements taking place in and around the public and private net interface, it is no wonder many managers are sitting on the fence.

Depending on how you define the task, there can be several options. Public alternatives offer bandwidth on demand, usage-based pricing and diverse routing. Dedicated lines offer a fixed fee connection between points for high-volume applications. All of the major interexchange and local exchange carriers offer both services.

When a user has decided that the public network can indeed support a specific application, it's time to do a feasibility study. There are several things to consider in this study (see chart, this page).

But for the most part, the more dispersed and varied a company's sites are, the more likely the public network will be able to offer less expensive connectivity. Running dedicated lines to a large number of sites can get quite expensive. Private networks are ideal for users with a few sites that call one another a great deal.

Public and private network pros and cons

Factor	Public network	Private network
Number of locations	Often better for routing traffic among a large number of geographically dispersed sites.	Usually better for routing traffic among a few geographically dispersed sites that communicate often.
Site volume	Low-volume traffic sites are usually better suited for public facilities, which require little investment and support.	As traffic volume increases, installation of private facilities often becomes more economical.
Equipment	Because equipment is located in the public network, users bypass capital and maintenance costs as well as fears of obsolescence.	Because users own the equipment, they control which features and functions to use. However, public net equipment users must rely on carrier deployment plans.
Access	Can be accessed via dial-up or dedicated facilities.	Accessed via dedicated facilities. Traffic can overflow to the public network.
Staffing	Much of the hassle associated with monitoring the network and maintaining equipment is off-loaded to the carrier but results in users' loss of direct control.	Requires users to hire and train internal staff to monitor and maintain equipment, which can be an expensive proposition.
Management	Provides users with limited on-line access to carrier systems for monitoring and reconfiguration.	Equipment vendors supply feature-rich management systems but rely on carriers for data to manage leased lines.
Cost	Is often more economical for nets with distributed traffic and low-volume sites. Also, more efficient for supporting centralized functionality such as voice mail and automatic call distribution.	Usually ideal for concentrated traffic and functionality. As the net becomes more distributed, public options start appearing more attractive, leading to creation of hybrid nets.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

The carriers, however, are throwing a curve into this relatively simple equation. They have started looking at private line-like pricing options for public services. MCI, for instance, offers a 120% price cap on its usage-based switched T-1 and switched T-3 services. This means users giving up a private T-1 or T-3 circuit for the switched alternative are guaranteed they will be charged no more than 20% above the leased-line cost should connect time in any given month be excessive.

"Our goal is to provide private line-like quality with usage-based pricing so that users have dedicated and switched alternatives," says Marty Burack, senior manager of data market development for MCI.

A related pricing concept is virtual private lines. This type of service allows users to buy a certain amount of switched bandwidth between two points for a fixed monthly fee.

This public net version of private data lines has been around for some time and has recently started showing up in the voice arena. BT offers National Networking Channels as part of its domestic virtual network service in the U.K. MCI and Sprint say they are looking at the idea, but AT&T says it has no near-term plans.

However, users of virtual private lines should expect to change customer premises equipment when shifting to these new public offerings. Virtual private lines create yet another carrier interface to be supported by equipment vendors.

Regardless of the public network's attractive options and appealing pricing, some users will never give up their private network. Users of IBM's Systems Network Architecture are a case in point.

"People do not yet fully appreciate the public network for what it can truly do," says a communications manager of a multinational pharmaceutical firm who asked to remain anonymous. "Mindsets are changing gradually, but there are still a lot of traditional IBM SNA folks that will be hard to move [into public networking] anytime soon."

The host-to-terminal polling structure of SNA is what makes it difficult to support SNA traffic over anything less than a dedicated circuit. Hosts expect remote terminals to quickly respond to polls, making the always active and fixed-cost nature of leased lines preferable and more economic than the usage-sensitive nature of dial-up connections.

For other users, it is a matter of destroying an already optimized private network. "We've got a major private-line backbone supporting voice, LAN-to-LAN, SNA, video and point-to-point traffic," says Rockwell's Ramey. "Taking traffic off that network to move to a public net service could ruin economies for the rest of the traffic."

Rockwell just finished a trial of Sprint's frame relay service that "simply did not economically match up against [the company's] private network option," Ramey says. The traffic will move back onto the private network.

"We use public services where they complement our private network, not [where they] compete against it," Ramey says. Rockwell uses virtual networks to carry the bulk of its corporate voice traffic.

Expect hybrid solutions

Many other firms will find similar opportunities and face similar decisions. In the end, most users will find hybrid networks to be a good compromise between the centralized intelligence of the public network and the economies and control of the private network.

No matter how sophisticated a private net, there is little doubt it still will not meet the broad diversity of the public network.

There are no magical answers — just a lot of opportunity for users. Users should expect to implement a stronger cadre of public/private network interconnection applications, but don't be surprised if that means there is more work involved in controlling the network.

"The capabilities of today's public network management systems have increased tremendously over the net management systems of five years ago," says L. Thomas Walton, president of Walton and Walton Associates, Inc. in Richmond, Va. "But when it comes to managing the full breadth of public network services as a complete pie, the crust starts to crumble. They still need some time in the oven."

Certainly, as these intelligent network connections with customer premises equipment become more sophisticated, other network support elements will catch up in functionality.

"We're using our private network for a lot of our traffic today," SCO's Gallo says. "But at some point, we'll be able to start using the ISDN capabilities of our Northern Telecom PBX to make better use of the public network, and then we'll have to take a look again. The trick is selecting the appropriate hardware to buy — you don't want to lock yourself out of any options." ◪

Send For Free Info

NW July 92

For more information on any of the products and services advertised in *Network World's ActionCenter*, circle the Reader Service Numbers on this coupon which correspond to the advertisements of interest to you.

Complete the coupon information and mail to: ***Network World***
P.O. Box 5090, Pittsfield, MA 01203

Name ______________________
Title ______________________
Company______________________
Phone (   ) ______________________
Street______________________
City ______________________
State ______________ Zip ______________

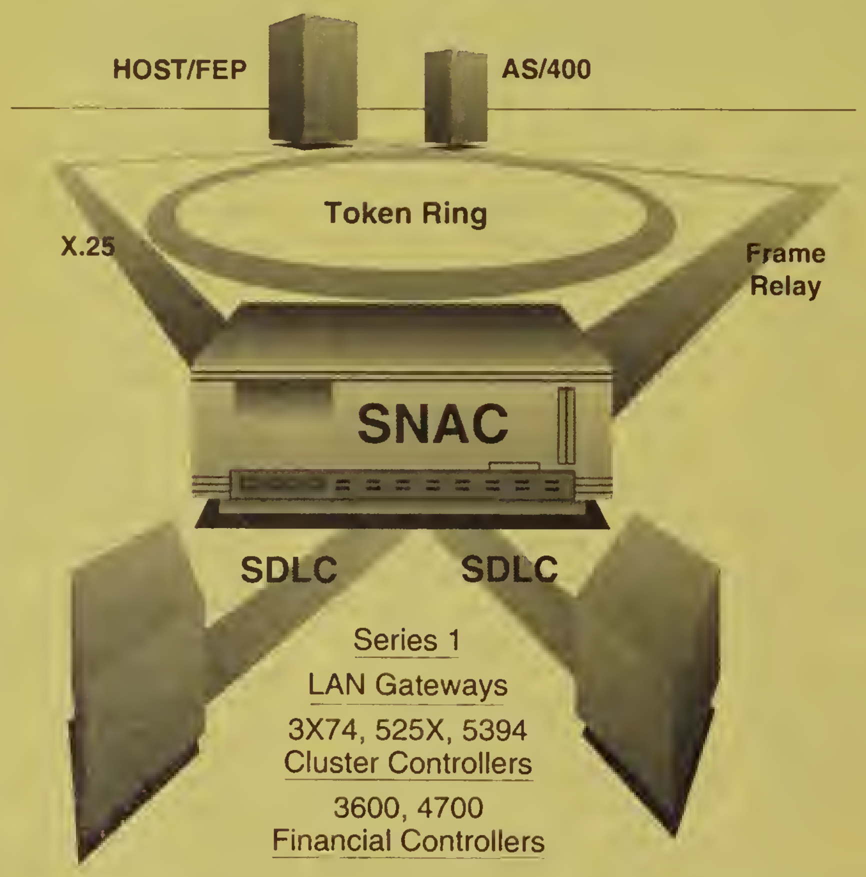
NW July 92

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56

Expires 10/31/92

ACCESS CONTROLLERS

SDLC to Token Ring? SDLC to Frame Relay? SDLC to X.25? YES!



Sync Research brings new life to SNA by giving you access to today's high-speed networks: X.25, Token Ring and Frame Relay. Sync's line of SNA Network Access Controllers (SNACs) is the broadest range of internetworking solutions on the market. Field proven and available **now**.

Save money, improve network performance, maintain centralized NetView management with the SNAC family of internetworking systems from the **industry leader.**

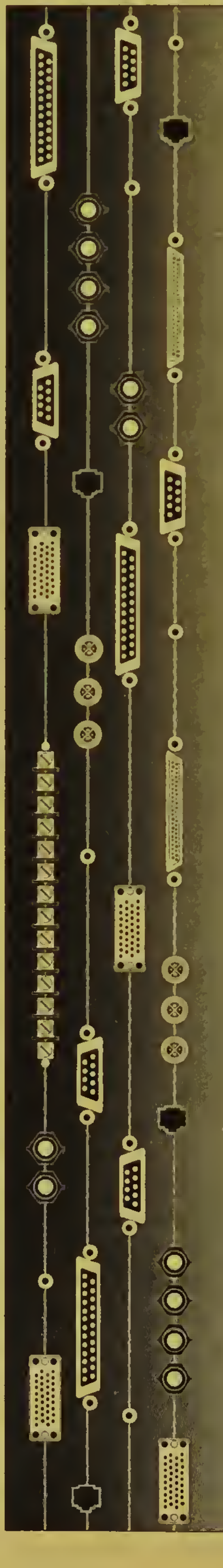
800-ASK-SYNC

Sync Research, Inc. 7 Studebaker
Irvine, CA 92718 • 714-588-2070

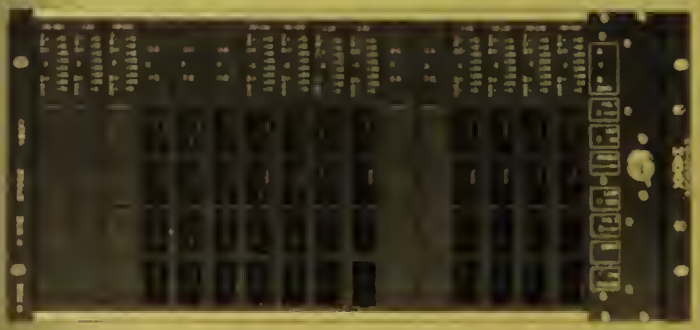
SYNC RESEARCH
InterNetworking SNA

Circle Reader Service No. **15**

SWITCHING/PATCHING/TEST EQUIPMENT



Finally...All the tech control functions in one package!



For any datacom manager, controlling a modern network is not a simple task. He has a mixture of digital and analog devices communicating at various speeds, on various protocols, and connected through an unusual variety of interfaces. To further complicate the issue, some equipment has been there forever and some has just been installed. Nevertheless, the network must be effectively managed to continue operation and maintain availability as close to 100% as possible.

The Series 2000 IntelliSwitch Control System is designed to work in just such an environment, regardless of how large your network is. Now, you can switch, back up, patch, monitor and alarm, test access, report on network performance, and control external test equipment on any interface and on any speed or protocol, with a single system and uniquely managed by a central control unit.

HP OpenView™ management, redundant power supplies, superior integration, and a great price make this product the ultimate tool for tech control and a great help to the datacom manager.

™ HP and OpenView are registered trademarks of Hewlett-Packard Company.

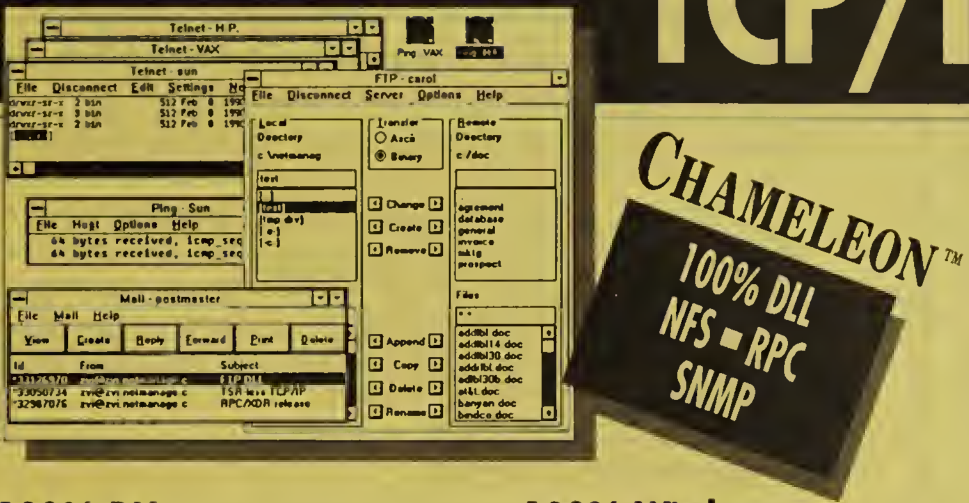
HADAX ELECTRONICS
Designed and Built Smart – a Hadax Tradition

11 Teaneck Road • Ridgefield Park, NJ 07660
(201) 807-1155 • Fax: (201) 807-1782

Circle Reader Service No. **16**

TCP/IP NETWORKING

TCP/IP for Windows



Applications:
TELNET (VT100, 220), FTP
SMTP/Mail, Statistics, PING
BIND, TFTP, Custom

Developer Tools:
- Berkeley 4.3BSD socket
- DLLs (TCP/IP, FTP, SMTP)
- ONC RPC/XDR
- SNMP API

NEW! **NFS Client & Server**

For overnight delivery call:

NETMANAGE™
(408) 973-7171
NetManage, Inc., 20823 Stevens Creek Blvd.
Cupertino, CA 95014 USA
Fax: (408) 257-6405

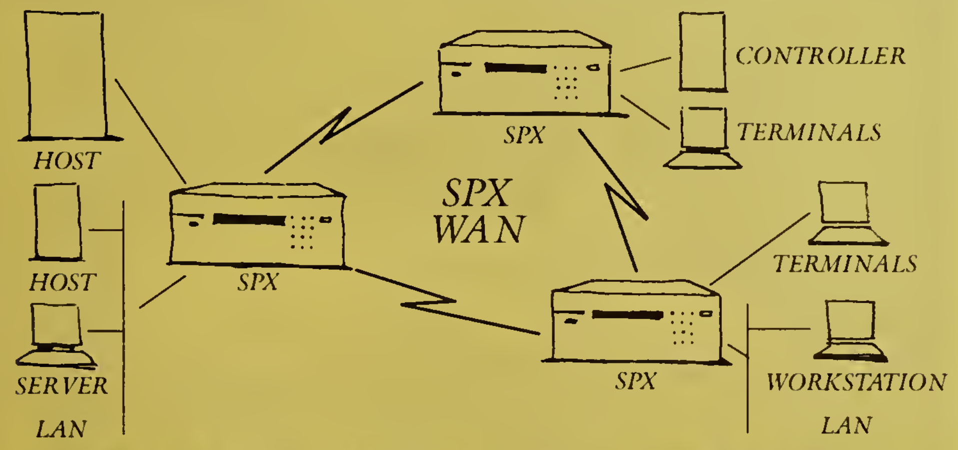
100% DLL
Implemented as a Windows DLL (not a TSR) using only 6K base memory

100% Windows
Point-and-click user interface, cut-and-paste, on-line help

Circle Reader Service No. **17**

ACCESS MULTIPLEXER

SPX: *Intelligent Wide-Area Networking Multiplexers*



Cost-effective way to build point-to-point, star, and multipoint sub-T1 WANs for terminal-to-host and LAN internetworking.

Call 800-388-4NET

NETWORK EQUIPMENT TECHNOLOGIES™

Circle Reader Service No. **18**

BRIDGE TOKEN RINGS

THE ONE BRIDGE IBM WOULD LOVE TO BURN.

NETRONIX 100% IBM Compatible ♦ Higher Performance Than *Any* IBM Bridge ♦ WAN Link Data Compression ♦ IBM LAN Manager and SNMP ♦ Downloadable Software/Flash Memory ♦ LCD Display ♦ Rack Mountable ♦ Less Than 30 Minute Installation ♦ Two Year Warranty

FREE 30 DAY EVALUATION

Local Bridges Start at $4690 ♦ Remote Bridges Start at $5890
To order with confidence or receive more information call:
1-800-282-2535 or 1-707-769-3300

Netronix
Always 100% Compatible.
Never Comparable.

Circle Reader Service No. **19**

A Subsidiary of AMP Incorporated

TOKEN RING CARD

If you're paying more than

$450.00

for your 4/16 Token-Ring MC or ISA Cards

you're paying too much!

GT8311 4/16 Mb ISA	$ 450.00
GT8312 4/16 Mb MC	$ 450.00
GT8313 4/16 Mb EISA	$ 525.00
GT8314 4/16 Mb 8 bit	$ 360.00

Manufactured for General Technology by ***Olicom***

- Certified by Novell® and Microsoft™
- Guaranteed 100% IBM Compatibility and Interoperability
- On-Board Media Filter
- Fastest Through-Put: (Network Computing March 1992) (PC Week November 1990)
- High Performance Drivers for all Major Lan Environments

Additional Discounts if you're not already using the OLICOM manufactured cards

Reseller Inquiries Invited

GENERAL TECHNOLOGY INC

General Technology, Inc., 415 Pineda Court, Melbourne, FL 32940
407-242-2733 **Sales:** 800-274-2733 FAX: 407-254-1407

All trademarks and registered trademarks are the property of their respective companies

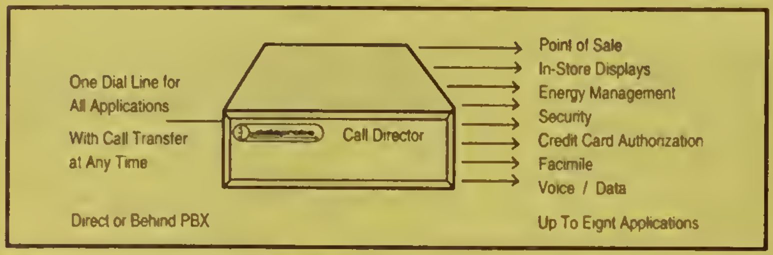
Circle Reader Service No. **20**

CALL DIRECTOR

SLASH Dial Line Costs 87%

The Math is Simple.
Payback = 3 Months

Multiple modems at one location can now share a single telephone line. Dataprobe's Call Director allows calls to be automatically switched to any of eight modems.



dataprobe

170 Coolidge Avenue / Englewood, NJ 07631
Phone: 201-569-6464 Fax: 201-894-0939

Circle Reader Service No. **21**

DATACOM MATRIX SWITCH

DISASTER PROTECTION
DESIGNED INTO THE *MTRX* TANDEM MATRIX SWITCH

THE STANDARD MTRX OFFERS 3-WAY PROTECTION AGAINST LOCALIZED DISASTERS SUCH AS FIRE, WATER, POWER, OR EQUIPMENT FAILURE

1 Separate	MTRX Tandem Matrix Switch Assemblies in different parts of your building
2 Distribute	MTRX Satellites up to 8 miles from each other
3 Connect	MTRX Satellites to the MTRX Tandem Matrix Switch Assemblies over dual, diversely routed Twisted Pair or optical fiber cables

Plus take advantage of these other MTRX BENEFITS

- •Largest Non-Blocked Port Capacity...8192 PORTS
- •Up To 98% Data Cable Reduction DTE to DCE
- •4000 FT DTE to DCE With Twisted Pair Cable
- •8 miles DTE to DCE With Optical Fiber Cable
- •LAN Based PC Control - Ethernet Or Token-Ring
- •Multi-tasking (VM-386) Universal Workstation
- •Integral BERG/BERT Test Functions
- •Non-Proprietary Database, dBASE III PLUS/dBASE IV
- •Supports Data Rates To 2.048MBPS

MTRX-500	512 Ports
MTRX-4000	4096 Ports
MTRX-8000	8192 Ports

Over 50,000 Ports Installed At RBOCs, Government, and Fortune 1000 Companies

Call us Today to Discover the *NEW DIMENSIONS* in Network Management Technology With the *MTRX* Family of *TANDEM* Electronic Matrix Switches

Datacomm
Management
Sciences Inc.

"The Responsive Ones"

25 Van Zant Street
East Norwalk, CT 06855
TEL: (203) 838-7183

dBASE III PLUS/dBASE IV are trademarks of Ashton-Tate Corporation

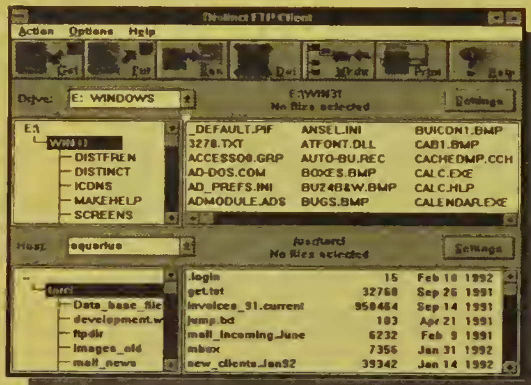
Circle Reader Service No. **24**

CONNECTIVITY SOFTWARE

Distinct® TCP/IP™ for Windows™

INTEGRATED NETWORK SOLUTION FOR MICROSOFT® WINDOWS™

- **Telnet** - multiple and concurrent sessions
- **FTP** - drag and drop - client and server
- **Monitor** - Ping, Statistics, etc
- Menu driven Network Configuration



```
_DEFAULT.PIF      ANSEL.INI       BUICON1.BMP
3278.TXT          ATFONT.DLL      CAB1.BMP
ACCESS00.GRP      AUTO-BU.REC     CACHEDMP.CCH
AD-DOS.COM        BOXES.BMP       CALC.EXE
AD_PREFS.INI      BU24B&W.BMP     CALC.HLP
ADMODULE.ADS      BUGS.BMP        CALENDAR.EXE
```

```
.login                    15   Feb 10 1992
get.txt                32768   Sep 26 1991
invoices_91.current   950464   Sep 14 1991
jump.txt                 103   Apr 21 1991
mail_incoming_June      6232   Feb  9 1991
mbox                    7356   Jan 31 1992
new_clients_Jan92      39342   Jan 14 1992
```

- TCP/IP protocol stack is **100% DLL** (uses only 5K DOS memory)
- Coexists with Novell, Banyan or LAN Manager at **no additional cost**
- Supports NDIS, ODI and Packet drivers
- Optional TCP/IP, RPC/XDR, FTP, Network Windows and Telnet Toolkit

(408) 741 - 0781

Fax: (408) 741 - 0795

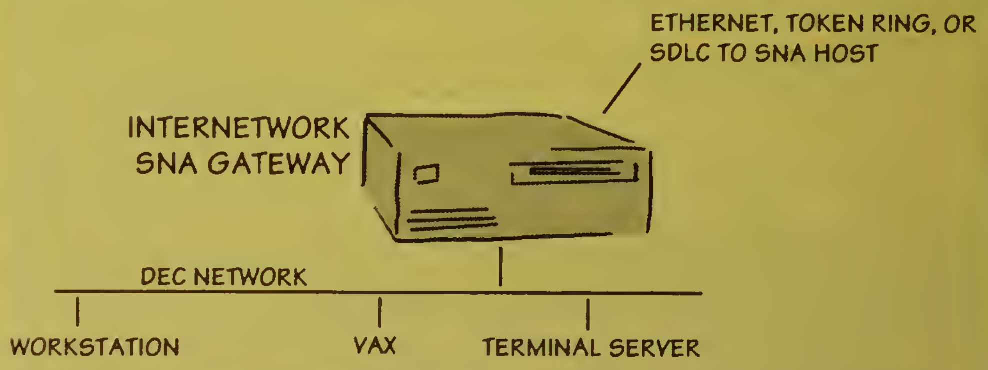
distinct

P.O. Box 3410, Saratoga, CA 95070-1410

Circle Reader Service No. **22**

DEC-TO-IBM

SNA Host Access For LAT-Attached DEC Terminals



With Netlink's Internetwork SNA Gateway™, LAT-attached DEC terminals and printers can access SNA host applications and operate as full-function 3270 devices. Reduces costs while maximizing network flexibility...Eliminates parallel networks...Supports from 16 to 128 SNA sessions...Connects to IBM hosts via SDLC, token ring, or ethernet...Requires no VAX resources!

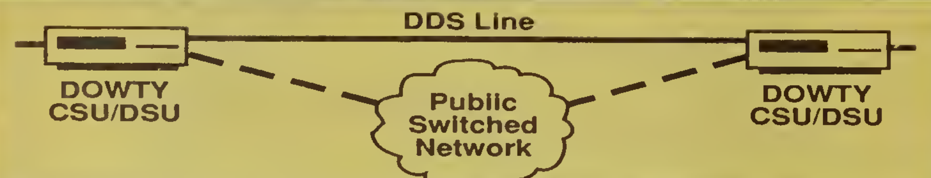
Call 1-800-NETLINK to learn more!

Circle Reader Service No. **25**

NETLINK INC

CSU/DSU

A CSU/DSU that keeps you up when the DDS line goes down.



The Dowty DCP4856 Multirate CSU/DSU can automatically switch to a dial-up line should the dedicated DDS line fail. Simply choose the integral V.32 modem option when you order. The DCP4856 will sense the failure of the DDS facility, establish the dial-up connection and perform the switchover, downspeeding the data flow as required. There is also a Switched 56 option that lets the DCP4856 dial switched digital services. You won't find a better buy.

- V.35 and RS232 interfaces
- Rate adaption
- Switched 56 access
- Point-to-point and multipoint
- V.54 diagnostics
- Built-in security
- Tabletop and rack mount
- UniMaster network managed

For more information on Dowty access devices and on our worldwide support team, call 800-227-3134 or write Dowty Communications, 9020 Junction Drive, Annapolis Junction, Maryland 20701.

Dowty Communications
Formerly CASE/Datatel

DOWTY

Circle Reader Service No. **23**

DIGITAL LINK SIMULATORS

Programmable Network Link Simulators

Don't Gamble With the Reliability or Performance of Your Network

The Adtech SX/12 and SX/13 Data Channel Simulators let you test your telecommunication equipment's handling of real-world network impairments to ensure system reliability and performance before you bet your business on it. Ideal for testing WANs, bridges, routers, multiplexers, inverse multiplexers, video conferencing equipment, etc. Simulate data links for reliability and performance tests, network equipment evaluations, product development, manufacturing tests, etc. These instantly available links range from RS-232 through T3 and SONET. You can program channel and subchannel delays, Gaussian errors, burst errors, targeted errors and more.

The SX/12 and SX/13 feature:

- ❑ Data rates up to 2.048, 8.448, or 51.84 Mbps
- ❑ Delays up to 10 seconds in 1 ms, 1us, or 8bit steps depending on model and data rate
- ❑ Gaussian and burst error generation with rates from $9.9x10^{-1}$ to $1.0x10^{-12}$
- ❑ Program complex sequences of link events
- ❑ Options permit targeting errors and delays at specific bits and subchannels of links
- ❑ Over 10 plug-in link interfaces available from RS-232 to DS-3(T3) and SONET STS-1
- ❑ IEEE-488 or RS-232-C remote control ports

ADTECH INC

1814 Algaroba Street
Honolulu, HI 96826

Circle Reader Service No. **26**

Call or fax for more information or a demonstration: 808-941-0708 or Fax 808-946-1300

DSU

THE DIGITAL NETWORKING LEADER

THE OFFICE-READY, INTELLIGENT DSU.

Our new DeskTop 500A Data Service Unit offers easy installation and diagnostic testing by nontechnical personnel at remote sites. Its compact, attractive design is just right for the office. A front-panel electronic display provides line speed, alarms, and test data at a glance. No adapter cables needed; the DeskTop 500A automatically selects CCITT V.35 or EIA 232-D interface and all DDS data rates. For easy order information, call the leader in digital networking at 1-203-792-0542, or toll-free at **1-800-777-4005.**

General DataComm

WORLD CLASS NETWORKING

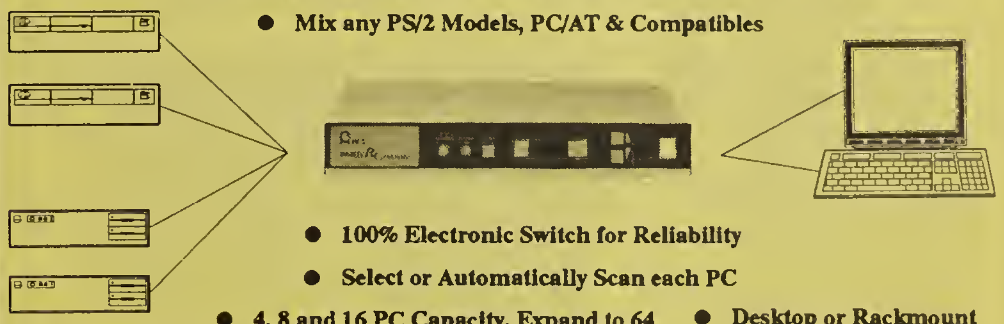
Circle Reader Service No. **27**

KEY BOARD/MONITOR SWITCHING

masteRConsole™

Control 2 To 64 PCs with One Keyboard and Monitor

Eliminate Keyboard/Monitor Clutter



- Automatically Boots each PC at Power-up for Unattended Operation
- Mix any PS/2 Models, PC/AT & Compatibles
- 100% Electronic Switch for Reliability
- Select or Automatically Scan each PC
- 4, 8 and 16 PC Capacity, Expand to 64
- Desktop or Rackmount

Save $ Save Space Save Time

The masteRConsole eliminates the clutter and cost of excess keyboards/monitors, reclaims valuable space, simplifies operations and centralizes control for environments with multiple PCs:

- File Servers
- Communication Servers
- LAN/WAN Bridges and Gateways
- Dial-in Access Applications
- Hardware/Software Testing

RCI
10-1 Ilene Court, Belle Mead, NJ 08502
Tel: 908-874-4072 Fax: 908-874-5274

Circle Reader Service No. **30**

FALL BACK SWITCH

Network Management Fallback Switch

The CDI AMS reduces your back up line costs

CDI's AMS is day and time programmable—it backs up the circuit only when required. Not only that, it's microprocessor based, so it can store multiple backup numbers. The backup is backed up. Real time reporting and the power of a microprocessor included.

CDI automatic switch - it's like having a technician on site.

AMS
AUTOMATIC MANAGEMENT SWITCH
CDI
BACK-UP "B"
PRIMARY "A"
TX RX RTS CTS DSR DCD DTR
POWER
TX RX RTS CTS DSR DCD DTR
B A
AUTO
ALARM
RESET

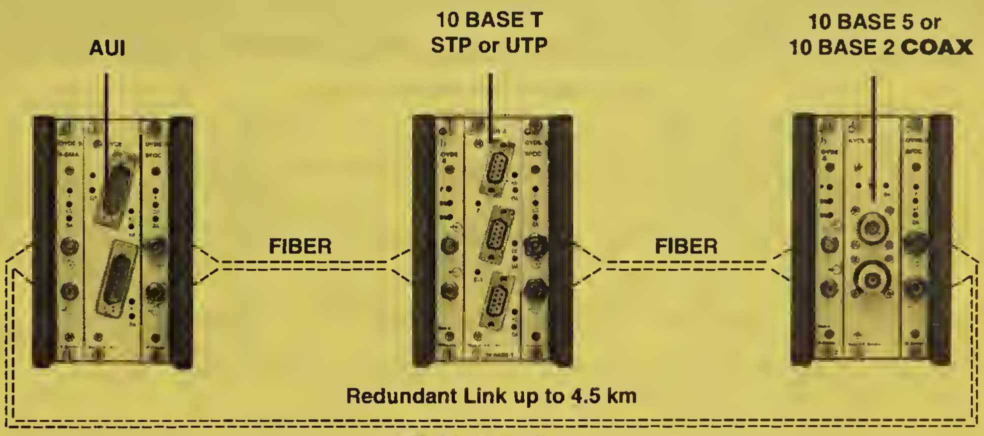
Communicatio[illegible] NJ 07011
Phone 201/[illegible]747 • 800/359-8561

Circle Reader Service No. **28**

CDI

LAN CONNECTIVITY GEAR

MULTIMEDIA ETHERNET CONNECTIVITY SOLUTION



Multimode Fiber

- RUGGEDLY DESIGNED FOR RELIABLE PERFORMANCE
- UNIQUE REDUNDANCY CONCEPT
- SUPPORTS UP TO 7 DIFFERENT TRANSMISSION MEDIAS
- FULL DESIGN AND INSTALLATION SUPPORT

Hirschmann

RICHARD HIRSCHMANN OF AMERICA, INC.
INDUSTRIAL ROW • P.O. BOX 229
RIVERDALE, NEW JERSEY 07457
Tel: (201) 835-5002 FAX: (201) 835-8354

Circle Reader Service No. **31**

FRACTIONAL T-1

FRACTIONAL T1 ACCESS UNITS

DROP & INSERT

COMPLETE PRODUCT LINE TO SUIT ALL YOUR FT1 NEEDS

RAD's full line of Fractional T1 access products provide solutions to your FT1 data and voice applications. The line includes a family of CSU/DSUs and high-speed multiplexers.

RAD From the growing Rad family.

data communications inc

TELEPHONE
(201)529-1100
FAX:
(201)529-5777

Circle Reader Service No. **29**

LAN HARDWARE

LAN Hardware Sale

Call for FREE Information Packet

PHONE TOLL FREE; 800-448-7420 OR FAX; 800-752-6958

ONE YEAR WARRANTY ON ALL HARDWARE

ETHERNET

AOUILA 88 10BT (NEW)	110	NOVELL NE1000	95
AOUILA 16B 10BT (NEW)	120	NOVELL NE2000	120
3C501	85	NOVELL NE/2 MCA	120
3C503	118	WO 8003E	95
3C503 10 BT (NEW)	150	WD 8003EP (NEW)	110
CONCENTRATORS (NEW) 12P 10BT	650	CABLE, T-CONN., TERMINATORS	CALL

TOKEN RING

IBM T/R 4MB TYPE I (LONG)	75	IBM MAU (8228)	325
IBM T/R 4MB TYPE II (LONG)	130	PROTEON MAU (8228)	200
IBM T/R 16/4 88 ISA (IN-STOCK)	450	DATA CABLES, PATCH CABLES	CALL
PROTEON P1347 4MB	180		

PROTEON PRO NET 10

P1300V	100	2400 WIRE CENTER (4 NODE)	50
P1303	140	2450 WIRE CENTER (4 NOOE)	100
P1308	230		

MISCELLANEOUS

ARCNET	CALL	CORVUS	CALL
IBM PC NET	CALL	LATTISNET	CALL
GATEWAY	CALL	AT&T STARLAN	CALL

WE BUY USED AND/OR SURPLUS LAN HARDWARE
(FAX US YOUR LIST)

LANFIX inc
DBA LAN RECYCLERS

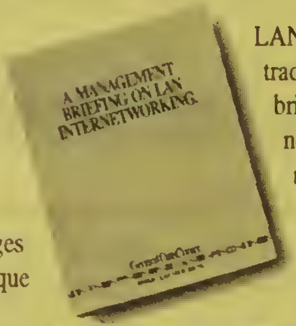
SINCE 1985

1378 WEST CENTER ST.
OREM, UTAH 84057

Circle Reader Service No. **32**

LAN INTERNETWORKING

FREE MANAGEMENT BRIEFING ON LAN INTERNETWORKING.



Interested in a new approach to LAN internetworking? Get this special General DataComm report on LAN Transport Management.™ This paper describes the advantages and disadvantages of traditional bridges and routers, and introduces a unique new approach from GDC.

LAN Transport Management offers traditional routing where required, bridging where desirable - and a new capability that provides routing, independent of all protocols, plus completely open network management. For your free copy, call 1-800-777-4005.

General DataComm

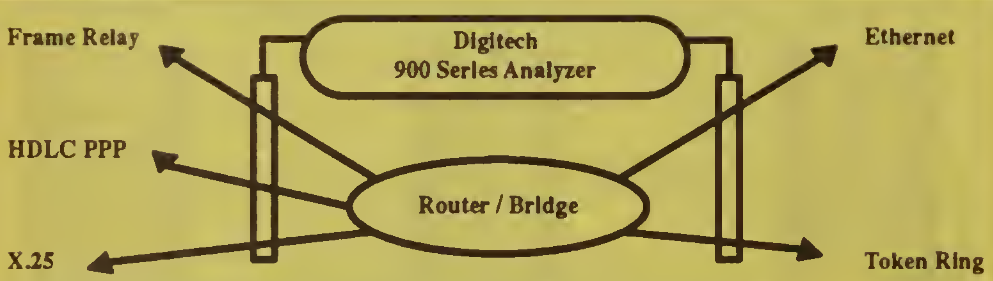
WORLD CLASS NETWORKING

WORLD HEADQUARTERS 1-203-574-1118 HONG KONG 852-526-5511 CANADA 1-416-498-5100 AUSTRALIA 61-2-956-5099
UNITED KINGDOM 44-734-774868 EUROPE, AFRICA, MIDDLE EAST HEADQUARTERS 33-1-30570200 JAPAN 81-33-862-1730

Circle Reader Service No. **33**

LAN/WAN INTERCONNECT TESTING

WAN/Frame Relay Testing to 2MB LAN Interconnect Testing



- Complete emulation, monitoring and certification for frame relay
- High performance - test 100% utilized circuits to 2MB
- 386 PC based - simultaneously test LAN's & high speed WAN's under windows
- Independently layered decodes include frame relay, HDLC PPP, HDLC/X.25, SDLC/SNA, Q.931, RFC-1294 encapsulation, IP, IPX, TCP, on WAN networks
- Unique two port switch / network emulation
- LAN analysis for Ethernet and 4/16MB Token Ring networks
- 7 Layer decodes include TCP/IP, Novell, AppleTalk, DECNet on LAN networks

Digitech Industries Inc
66 Grove Street Ridgefield • CT 06877 USA

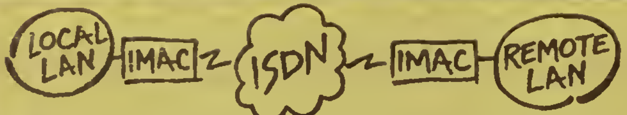
CALL 1-203-438-3731

Circle Reader Service No. **34**

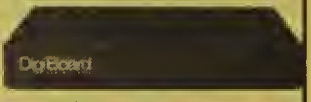
LAN/WAN INTERNETWORKING

ISDN Connectivity

Now for just $2,195, your Ethernet LAN can go anywhere ISDN goes. With "local" performance for every user.



Introducing DigiBoard IMAC, a far-reaching cost/performance break-through in LAN bridge technology. DigiBoard IMAC provides the industry's first direct, completely transparent connection between Ethernet and ISDN. It works with any network OS. Any host, platform or bus. Any ISDN CCITT switch, including AT&T and Northern Telecom. And it gives remote LAN users the "local" performance they've been asking for. All for just $2,195, plus an affordable ISDN line cost of $40 to $60 per month. Call for the whole story, then let us arrange an on-site NO-RISK TRIAL. See why DigiBoard IMAC is the smartest LAN bridge connection you can make.



Circle Reader Service No. **35**

DigiBoard
Connectivity Solutions from Digi International

© 1992, Digi International Inc. (800) 344-4273 · (612) 943-9020 · FAX (612) 943-5398

MAC/DOS/WINDOWS/CLIP-ART

An Introductory Offer From NETWORK WORLD

NetDraw

Clip Art for Building Networks ™

Because In Your Job, A Picture Is Worth Much More Than 1,000 Words.

- The first clip art library created exclusively for networking professionals
- Over 170 professionally drawn symbols for Computing, WANs, LANs, Telephony Personal Computing, Patching and Cabling
- Available for DOS, Windows and Macintosh applications
- Symbols can be pasted into a variety of graphics, word processing, page layout and presentation documents
- Available at a low introductory price of $99.95

Price/availability subject to change. 30-day guarantee conditions: shipping/handling not refundable, product must be in original condition. Seal must not be opened on software. All trademarks and tradenames are properties of their respective owners. Allow 4-6 weeks for delivery.

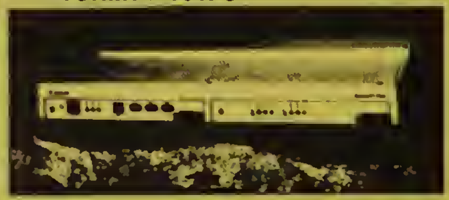
Circle Reader Service No. **36**

Call 1·800·643·4668 to order your copy today!

MULTI LINE CSU/DSU

WHEN SELECTING T1 DSU/CSUs, PUT YOURSELF IN THE PLUS COLUMN

- Access to T1, fractional T1 and virtual private networks
- Drop and Insert
- 2 ports, expandable to 6
- Support of 1 or 2 T1 lines
- T1 performance monitoring
- Verinet 2 integrated remote management for ConnecT1 Plus and all Verilink ESF CSUs
- Verilink Value



SO GET INTO.....THE PLUS COLUMN

FOR YOUR FREE VERILINK PLANNING KIT

CALL TODAY

1-800-669-4278

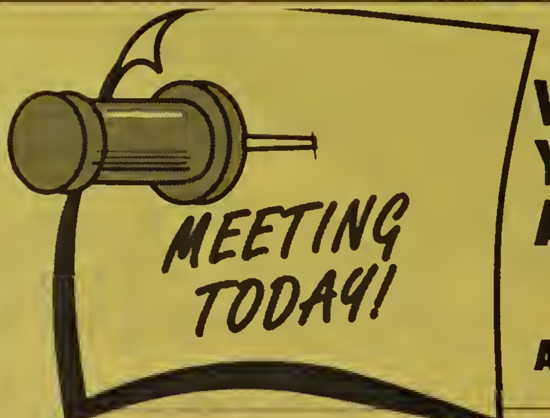
THE HELFRICH COMPANY

Circle Reader Service No. **37**

ConnecT1

PLUS

NETWORK BASED CALENDAR


MEETING TODAY!

WHAT IF YOU HELD A MEETING ...

AND NO ONE CAME?

MON.
TUES.
WED.
THURS.
FRI.
SAT.
SUN.

CalScan Network Based Scheduling Calendar For Macintosh and IBM compatible computers.

- MAC/DOS software for calendar scheduling
- Networked meeting management in mixed MAC/DOS environments
- Group and individual scheduling

To order or to receive a free demo disk call **(703) 243-9550**

See us at MACWORLD/Boston Booth #1944
RBC, Inc. 2101 Wilson Blvd., Suite B01 Arlington, VA 22201

Circle Reader Service No. **38**

NETWORK SERVICES

AP SATNET

A Wholly Owned Subsidiary of The Associated Press

DOMESTIC & INTERNATIONAL

Satellite Data Broadcast
(U.S. - South America - Europe)

X.25 Packet Switching

Terrestrial Services

3rd Party Installation & Maintenance

AP SATNET
50 Rockefeller Plaza
New York, NY 10020
Tel. # (212) 621-7800
Fax # (212) 621-1512

Call us for a FREE consultation TODAY!

Circle Reader Service No. **39**

RING SCANNER

TROUBLESHOOTING YOUR TOKEN RING NETWORK SHOULDN'T TIE YOU UP ALL AFTERNOON.

Finally, a faster, easier way to test your token ring. RING SCANNER™ quickly detects cabling problems, isolates defective MSAUs and verifies the proper installation of both 4 and 16 Mbps token ring networks, at a fraction of the cost of more complex token ring testers.

RING SCANNER

- Easy to use, includes cables and connectors
- Detects shorts, breaks and mis-wires in cabling
- Isolates defective MSAU's
- Automatically detects 4 or 16 Mbps operation
- Inserts transparently on an active ring
- Generates phantom voltage needed to activate MAU's
- Simulates faults to test network management software
- Differentiates between data packets and tokens

For more information about RING SCANNER and your free LAN Troubleshooting Guide, contact Microtest at 800-526-9675.

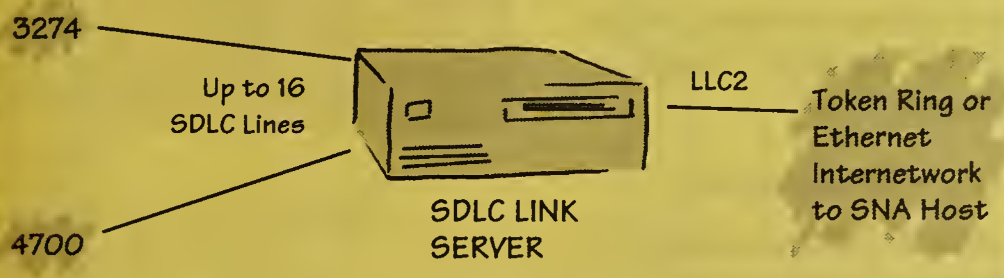
Circle Reader Service No. **41**

Microtest Inc., 3519 E. Shea Blvd., Phoenix, AZ 85028, 602-971-6464 Fax: 602-971-6963

MICROTEST®

SNA INTERNETWORKING

Netlink's SDLC Link Server.™ Now, An Even Better Way For SNA.



- Connect SDLC devices to token ring or ethernet LANs.
- Convert SDLC data to LLC2.
- Transport SNA across your internetwork.
- Merge parallel networks; reduce costs.
- Improve network performance.
- Manage via IBM's NetView® or our new In/View™ program.

Call 1-800-NETLINK!

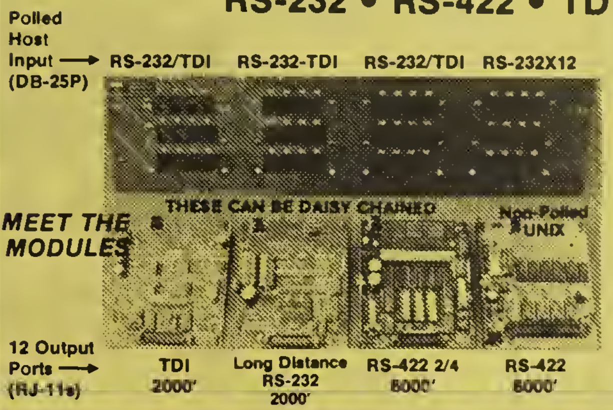
NETLINK INC

Circle Reader Service No. **40**

TERMINAL CONNECTIVITY

CPS **P-CON 48** PATCH PANEL CONVERTER

THE FLEXIBLE TWISTED PAIR CABLING SYSTEM FOR POLLED AND NON-POLLED TERMINAL NETWORKS
RS-232 • RS-422 • TDI (Unisys)



- Use Same Topo for Future LANs
- Modular 12-48 Ports per Panel
- Add 12 Port Modules as Needed
- Each Port is Separately Regenerated
- Transparent to Data Rates to 115 KB
- LEDs and Audible Streaming Alert
- Mix and Match Modules on the Same Panel
- Fits Standard 19" Rack
- Stand Alone 12 Port Version Also Available
- Terminal End Converters and Boosters for Extra Long Cable Runs Are Available

Average $50 Per Port
Beats the SR Modem Approach

The Snap On MODULES Provide the Signal Disciplines that You Need to Turn Your Passive Cabling System into an Active Long Distance Twisted Pair System.

Circle Reader Service No. **42**

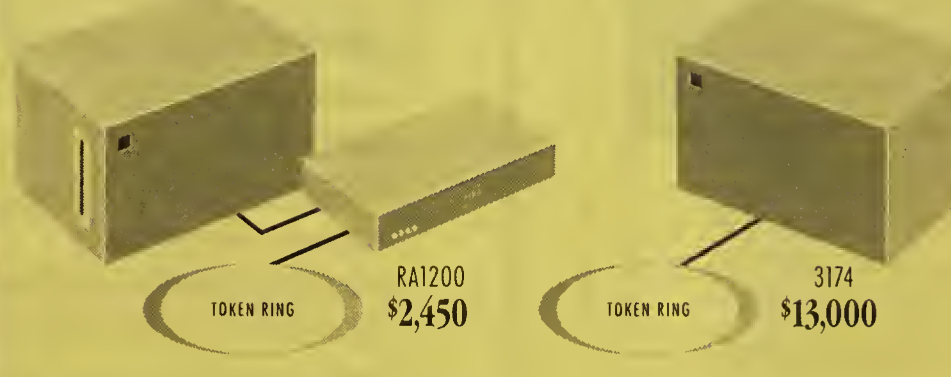
ALSO
- Modem Sharing
- Fiber Optic Conv
- Port Sharing
- Dialer Products

Computer Peripheral Systems
P.O. Box 98282
Atlanta, Georgia 30359

Phone: 1-800-888-0051
(404) 908-1107
Fax: (404) 908-1208

TOKEN RING ADAPTORS

3274 + RA1200 = 3174



- Dedicated hardware that uses the IBM Token Ring chipset.
- Remote configuration with *standard* Telenet and TCP/IP.
- Network Management — supports both Netview and SNMP.
- Reliable — eliminates single points of network failure.
- Two ports — supports up to ten 3274s in multi-drop mode.
- Multiple unit pricing as low as $1,800 per unit.

RING ACCESS

957-R INDUSTRIAL ROAD, SAN CARLOS, CA 94070 • TEL (415) 592-5853 • FAX (415) 592-5841

Circle Reader Service No. **43**

VOICE/DATA/FAX MULTIPLEXER

DATA RACE Announces Multiplexer Breakthrough

NEW Voice/Fax/Data Multiplexer saves end-users tens of thousands of dollars

By Paul Longoria

SAN ANTONIO, Texas — If you can say yes to the next two questions then you may be in for a pleasant surprise!

1. Do you have remote computer users that need access to your LAN, mini, or mainframe?
2. Would you be interested in eliminating a substantial portion of your expensive long-distance telephone charges?

Powerful, New Technology

Now, thanks to the emergence of a powerful new class of multiplexers, you can save up to $6,000 per user per year in operating and line costs AND save up to an additional $23,712 per year in long-distance charges for each phone line you replace!

> **"Our company was wasting $83,712 a year without DATA RACE's MACH DS Mux"**
> **— MIS Manager**

Be A Budget Hero!

With today's economic climate, corporate management will be pleased with Data Communication Managers that use this affordable, new technology as an easy, fast way to save on tight budgets.

New Industry Leader

DATA RACE, a long-time price/performance leader in the statistical multiplexer field, is introducing the industry's most cost-effective, high performance Voice/Fax/Data Multiplexer series. From 8 to 64 ports, the new MACH DS multiplexers include these 5 important features:

1. Toll-Free Voice and Fax
2. Up to 3 Voice channels per link
3. Multiple Digital or Analog links
4. Connects to existing facilities
5. Pays for itself in months not years!

Free, No Risk, 30-Day Trial

For a limited time, DATA RACE is offering a FREE savings evaluation survey and a FREE 30 day no-risk trial to qualified users. For details call 1-800 999-7223.

DATA RACE, 11550 IH 10 West, San Antonio, Texas 78230

Circle Reader Service No. **44**

NETWORKING MARKETPLACE

TRAINING

SAA
SNA · OSI
TCP/IP · T1 · X.25
FRAME RELAY · LAN
DIGITAL SWITCHING
SAA · SNA · OSI
TCP/TP
T1

TELETUTOR®
USING TECHNOLOGY
TO TEACH TECHNOLOGY™

1-800-542-2242
FAX (603) 433-2260
CALL FOR CATALOG OF
ALL OUR COURSES

COMPUTERS

HIGH VOLUME AT&T
COMPUTER
PERIPHERAL
SALES & PURCHASES

- Modems
- Color Terminals
- Data Sets
- Controllers
- Keyboards

C T D I
Communications Test Design, Inc.

800-458-0398
215-431-5941

B I G MONEY!

That's what Network World readers spend each year on products and services just like yours! Big Money! The average reader buys 20 different products and services for 28 sites, spending $7 million each year.

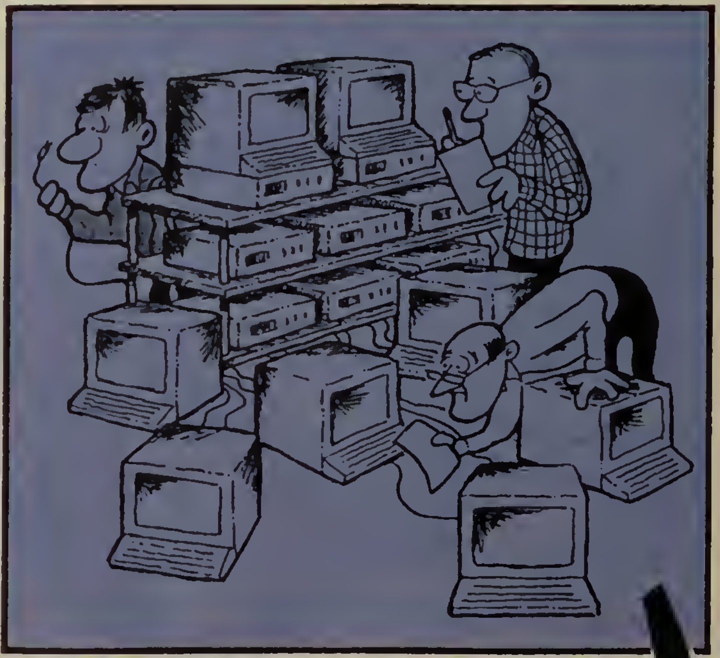
Make sure those key customers know about your company!

ADVERTISE IN THE NETWORKING MARKETPLACE!

**Call today!
Shannon Summers
at 800-622-1108**

CONTROL UP TO 96 PC
FILE SERVERS WITH 1 KEYBOARD
AND MONITOR USING...
COMMANDER
by cybex

- Select via Keyboard
- Dual access up to 250 feet away (optional)
- No external power
- Mix PC, PC/XT, PC/AT and PS/2
- "AutoBoot™" Feature boots attached computers without operator intervention
- Shows PC power status



- PS/2 Mouse support available
- Each unit accommodates from 2 to 8 PCs
- Up to 12 units can be cascaded
- Mounting kit available for 19" and 24" rack installation

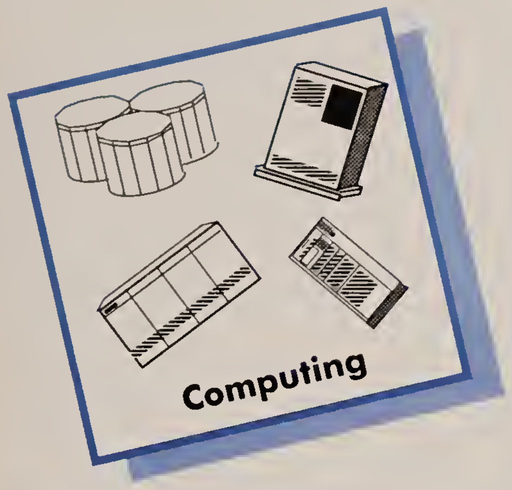
Dealer Program Available

Cybex Corporation
2800-H Bob Wallace Ave.
Huntsville, Alabama 35805
(205) 534-0011
Fax (205) 534-0010

PC, PC/XT, PC/AT and PS/2 are trademarks of International Business Machines Corp.

Circle Reader Service #119

An Introductory Offer From NETWORK WORLD
Available for DOS, Windows and Macintosh Applications

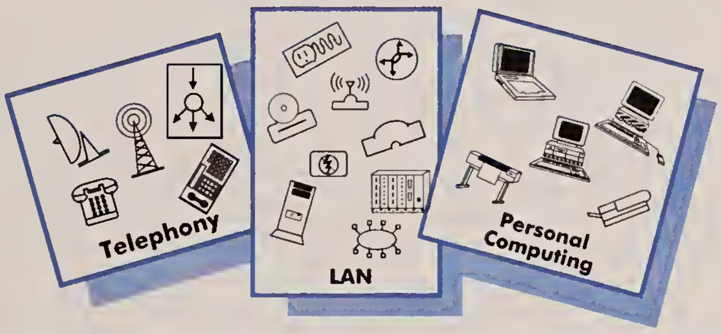


Because In Your Job, A Picture Is Worth Much More Than 1,000 Words.

Let your networks speak for you loud and clear with *Network World's* NetDraw™, the first clip art library created exclusively for networking professionals.

With over 170 professionally drawn objects, NetDraw gives users immediate access to symbols for WANs like modems and multiplexers and LANs like bridges, routers and servers – just to name a few. Symbols for computing, PCs, telephony and patching and cabling are also provided to make your networks complete – with just the right amount of detail.

- Add clarity and consistency to network drawings
- Make drawing modifications, network redesigns, and topology changes quickly and easily
- Add a professional look to proposals, bids and training materials
- Eliminate the hours spent creating "home grown" symbols



NetDraw is available in Macintosh, DOS and Windows versions and is designed to work with almost all popular drawing, graphics, word processing, page layout and presentation programs. It is an extremely powerful productivity tool yet is simple to use.

NetDraw is available at the low introductory price of just $99.95. Ask about multiple copy discounts.

Make your network documents speak for you loud and clear! Call or use the form below to order your copy of NetDraw today!

NetDraw Clip Art for Building Networks ™

**Call
800-643-4668
To Order Today!**

**Call 800-756-9430
To Have Our
Brochure and
Sample Page
Automatically
Faxed Back To You**

To order NetDraw, fill out the form below completely and fax to 508·879·3167 or mail to NetDraw, c/o Network World Inc., 161 Worcester Road, Framingham, MA 01701.

If you'd like more information on the product, call 800·643·4668 or fill out top portion of card and drop in the mail.

Name ______________________
Title ______________________
Company ______________________
Address ______________________
City ____________ State ______ Zip Code ______
Tel ____________ Fax ____________

Method of Payment
___ Number of copies at $99.95 (plus state sales tax if applicable and $4.95 for shipping and handling)
☐ Visa ☐ MasterCard
Account Number ______________
Signature ______________
Expiration Date ______________
☐ Check Enclosed (add s+h and state sales tax if applicable)
Make check payable to Network World, Inc.
Please indicate appropriate version:
☐ MAC ☐ Windows ☐ DOS

Price/availability subject to change. 30-day guarantee conditions: shipping/handling not refundable, product must be in original condition. Seal must not be opened on software. All trademarks and tradenames are properties of their respective owners. Allow 4-6 weeks for delivery.

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 866 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

NetDraw
c/o Network World, Inc.
The Meadows
161 Worcester Road
Framingham, MA 01701-9525

LANS

INTEL...EAGLE...CHEAPER THAN DIRT...

3Com BUY • SELL • REPAIR • NEW • USED 3Com

Bridge Communications

- We Sell **3Com** Up To 80% Off List
- We Sell All **3Com** Hardware and Software
- We Sell **3Com**/Bridge Parts and Peripherals
- We Warranty All Products!

We Stock All **3Com** Servers, Memory, Expansion Cab., Disk/Tape Drives, Motherboards, Power Supply, Multiconnect, Netbuilder, CS, NCS, IB, 3Station

Current Specials on New Ethernet & Token Ring

	3COM	INTEL	ADDTRON	EAGLE
8 BIT COAX	160	•	95	145
16 BIT COAX	160/.255	130	110	160
8 BIT TP	170	•	95	•
16 BIT TP	165/265	130	110	160
4 MB TOKEN	300	490		
16/4 MB TLM	•	490		

MC & VISA

QUANTITY DISCOUNTS AVAILABLE

ALL ADAPTORS ARE NOVELL, AND LAN MGR. COMPATIBLE
CALL FOR PRICES ON USED 3COM ADAPTORS & SYNOPTICS!
CALL FOR PRICES ON HUBS, REPEATERS, POCKET ADAPTORS.

ERGONOMIC INC., 22 COMMERCE DR., FARMINGDALE, NY 11735

CALL: 800-AKA-3COM (252-3266) FAX: 516-293-5325

3COM...ADDTRON...ALMOST FREE!

TCP/IP for DOS

◆ TCP/IP applications: FTP, TFTP, TELNET/RLOGIN, R-utilities, remote printing with UNIX-compatible LPR/LPQ/LPRM/LPD, FTPD/TFTPD servers, PING, FINGER, third-party terminal emulation support, more . . .

◆ Support ***multiple concurrent sessions*** in Quarterdeck DESQview or Microsoft Windows 3.0.

◆ Support **NDIS, ODI** and **PACKET** driver interfaces for **Ethernet** and **Token Ring** adapters. Coexist with Novell's Netware or Microsoft's LAN Manager on the same adapter. Also support dial-up SLIP using COM1 to COM4.

◆ Direct file transfer between:
  - A Host system and a Netware or LAN Manager server
  - PC/DOS systems
  - Host systems

◆ NFS client.

◆ Backup/Restore DOS files using any remote UNIX system's tape drive (UNIX TAR format).

◆ Turn printer attached to a PC/DOS system to a network printer (accessible by network users).

◆ BSD-compatible socket library for application development.

◆ Function as IP router between Ethernet/Token Ring/SLIP networks.

◆ BOOTP supports concurrent downloading of upto 16 clients at the same time, over multiple network segments.

1762 Technology Dr., Suite # 108
San Jose, CA. 95110
Tel (408)453-6150/Fax (408)453-5915

Lanera corporation

CABLETRON Good As New

40%-50% Off List

Full Manufacturer's Warranty

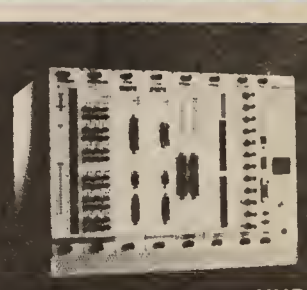
Cabletron Systems, the company that invented *"The Complete Networking Solution,"*™ now offers a full line of reconditioned networking products ...**All** in like-new condition...**All** 100% factory guaranteed...**All** backed by the industry's finest tech support staff...And **now available** direct from Cabletron at 40% to 50% off standard list prices!

HUBS and MODULES

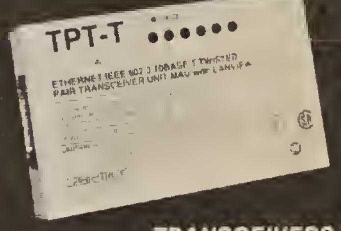
TRANSCEIVERS

REPEATERS

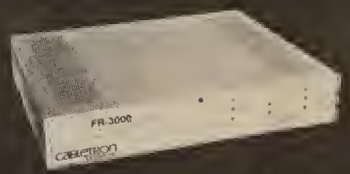
BRIDGES



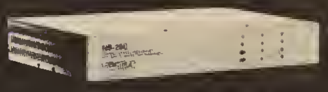
HUBS


TPT-T
ETHERNET IEEE 802.3 10BASE-T TWISTED PAIR TRANSCEIVER UNIT MAU with LANVIEW

TRANSCEIVERS



REPEATERS



BRIDGES

Call Cabletron Today

603/332-9400 Ext. 2172

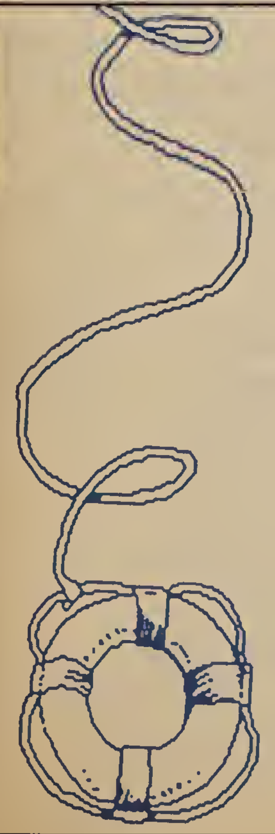
and find out what's in stock.

Cabletron/Good As New

Like-new networking products
for all your connectivity needs.

CABLETRON SYSTEMS Inc.
The Complete Networking Solution™

COULD YOUR SALES USE SOME HELP?



Reaching 150,100 highly-qualified *Network World* readers could be just the lifeline you need in this economy.

Use the Networking Marketplace to get your message out to pre-qualified and proven buyers of your products and service.

The *Network World* reader buys 20 different products for 28 sites, spending $7 million annually across the enterprise network.

Shannon Summers
800-622-1108 ext 596
or 508-875-6400 ext 596

TELECOMMUNICATIONS

PUBLIC NOTICE

TO
ALL AT&T PRIVATE
LINE CUSTOMERS
(ACCUNET T-1.5, T-45, ASDS, DDS)

Discounts up to
57%
on Monthly Line Charges

Huge Savings Available With This New Aggregated Program.

CALL FOR INFO
1-800-722-2668

GLOBAL LONG DISTANCE MARKETING
7051 W. Commercial Blvd
Tamarac, FL., 33319

World's Fastest Large CALL ACCOUNTING-FACILITIES MGMNT

Stryker Systems has replaced hundreds of call accounting/facilities management systems having problems with: 1. Larger number of records than can be handled within seconds on a multiuser system, up to millions; 2. Taking more than 5 seconds to complete the longest reports; 3. System too difficult to understand & work with; 4. User defined reports, interfaces & features too limited or difficult; 5. Lost records, file corruption, database crashes; 6. Records don't match the telephone company's; 7. Complex or unusual customization requirements; 8. Fault tolerant reliability & redundancy required; 9. Realtime Processing.

• **BILLBACK:** corporate, hospital, university, hotel, attorney, engineer. • **RESALE:** shared tenant residential, service bureau, IXC, OSP. • **MULTI-SITE POLLING:** tie line network segments call record reconciliation (match & merge), T1, tandem networks. • **INTERFACING:** direct connect to all mini & mainframe accounting systems, electronic mail, automatic log in & reprogram PBX, 9 track tape. • **COMPATIBILITY:** DOS/UNIX, Centrex, private network 7 digit nationwide dialing, ISDN, ANI & DNIS, auto attendant & Voice Mail. • **UPLOAD/DOWNLOAD** name/station/department database to/from PBX/mainframe. • **CUSTOM COSTING:** all carriers and private networks from any point to any point.

World's Fastest Call Accounting & Billing; On-line personnel directory; work order and trouble ticket admin & billing; CAD voice & data equipment inventory; CAD cable pair tracking.

Call **STRYKER SYSTEMS** 818-545-8680 ext 725
100 NORTH BRAND BLVD, SUITE 400, GLENDALE, CA 91203

REMINDER:

THE AUGUST 3RD ISSUE CLOSES JULY 22

1992 TCA

Annual Conference

PRE-REGISTER & WALK RIGHT IN

Telecommunications Applications in Business Today

Annual Conference:
September 21 — 25

Exhibits:
September 22 — 24

San Diego Convention Center
111 W. Harbor Drive
San Diego, California

KEYNOTE SPEAKER:
Lt. General Thomas W. Kelly, Former Director of Operations, Joint Chiefs of Staff

ALL SEMINARS AND EXHIBITS OPEN TO THE PUBLIC

THREE FULL-DAY SEMINARS

OVER 50 EDUCATIONAL SEMINARS AND PANELS

OVER 350 MAJOR EXHIBITORS FROM THE U.S., EUROPE AND ASIA ADVANCED EXHIBITS

REGISTRATION
Pre-register by Sept. 1 and receive your badge in the mail. No need to check in on-site, just walk right in. Complete the form below and send a check or money order for $20 payable to the Tele-Communications Association.

WHERE TO MAIL
Mail this completed form and your check to:
TCA Annual Conference
858 S. Oak Park Rd, Suite 102
Covina, CA 91724-3674

ON-SITE REGISTRATION
After Sept. 1, register on-site by taking this form to the general public registration desk at the San Diego Convention Center. Registration is open Sunday through Thursday.

INFORMATION PACKET AVAILABLE
All of our seminars are open to the public. Call for a free information packet:

818-859-2657

EXHIBITS REGISTRATION

First Name ____________
Last Name ____________
Title ____________
Company ____________
Street ____________
City ____________ State ___
Zip Code _____ - ____ Country ____________
Phone ___ - ___ - ____

Are you a TCA member? Y N

Would you like information about membership? Y N

Please indicate to which industry your organization belongs (circle one):

01 Manufacturers (other than computer/communications)
02 Finance/Banking
03 Insurance
04 Real Estate
05 Healthcare Services/Hospitals
06 Legal
07 Hospitality/Hotels
08 Retail/Wholesale Trade
09 Transportation
10 Utilities
11 Education
12 Process Industries (mining/construction/petroleum/agriculture/forestry)
13 Government—State/Local
14 Government—Federal
15 Military
16 Aerospace
17 Telemarketing
18 Advertising
19 Entertainment
20 Manufacturing (computers/communications)
21 Publishing
22 Other__________

Circle Reader Service #120

DATA COMM

Manage *All* Your Modems

From one local/remote PC.

Get real-time monitoring of line activity, ring-no-answer, and modem faults. Display live or historical records in color graphics.

Works through control card in HDS chassis for our DDX modems. Intercept module puts any modem, up to 4000, under same manager.

800-521-2496

FastComm
Communications Corp.
Sterling, VA 22170

Maximum Modems

High Density Shelf (HDS) holds 16 V.32(bis) modems in 5.25 in. of rack space.

- Less than 12 in. deep; 384 fit in a 6-ft cabinet.
- Shelf controller supports net management station.
- HDS holds mixed speeds, dial and leased line.
- (Dual) AC or -48 V dc power supplies.

800-521-2496

FastComm
Communications Corp.
Sterling, VA 22170

PUBLICATIONS

Patricia Seybold Group

FREE-TRIAL OFFER
to
Distributed Computing Monitor

Start a trial subscription to *Distributed Computing Monitor*, the leading monthly report on distributed computing and object technology.

After reviewing your first issue, you can either pay the bill and continue receiving *Distributed Computing Monitor* or write "cancel" on the bill and owe nothing.

Fax, phone, or write us with your name and address. *Distributed Computing Monitor* is priced at $495 per year (Canada—$507; Foreign—$519).

Fax: (617) 742-1028
Phone: (800) 826-2424 or (617) 742-5200
Mail: 148 State St. 7th Floor
Boston, MA 02109

Buy, Sell Or Announce Through Network World's Classified Section

Buying or selling communications-related products or services?
Or do you want to announce an upcoming event or business opportunity?
If so, Network World's classified section is the right choice for you.

You'll reach more than 150,100 communications/networking professionals all of whom are buying decision makers. And you'll reach them every week. Find out just how effective and cost efficient Network World classified advertising can be. For all the facts write or call: Network World, Classified Advertising
Shannon Summers, 161 Worcester Rd, PO Box 9172, Framingham, MA 01701-9172; 800-622-1108 (in Mass., 508-875-6400)

DATA COMM

"LOWER YOUR EXPENSES,
...NOT YOUR EXPECTATIONS"

FOR THE LARGEST
INVENTORY OF
SECONDARY

**N.E.T.
&
TIMEPLEX**

T-1 NETWORKING EQUIPMENT

PLEASE CALL ANDREW PEROS
609-661-0040

SAVE 50% & MORE
ON MOST PRODUCTS
BUY/SELL/NEW/USED
Reconditioned With Warranty

Modems • Multiplexers • T-1 •
CSU/DSU's • Channel Banks •

AT&T CSU/DSU NEW!	$275
T-1 CSU's	$499
T.P. 557 CSU/DSU 56Kbps	$195
Infotron T-1 Equipment	60% Off
Datatel 9100	CALL
Tellabs 440 and 445	50% off
Newbridge Channel Banks	$3995
Omnimux 82 muxes-8 port	$695
Stat Muxes 4,8,16,32, port	LOW
Ethernet Bridges NEW!	$1695

≡METROCOM≡
**(800) 364-8838
or (713) 783-8838
FAX (713) 783-8832 24 HRS**

PROTOCOL
CONVERSION

WAN BRIDGES
WAN ROUTERS

Thomas Engineering has the solutions you need to provide anyone at your facility with access to your IBM, SPERRY or BULL mainframe(s) via their ASCII terminals or PC's. Call us about our trade in offer on Renex, IBM, Andrew & Black Box protocol converters!

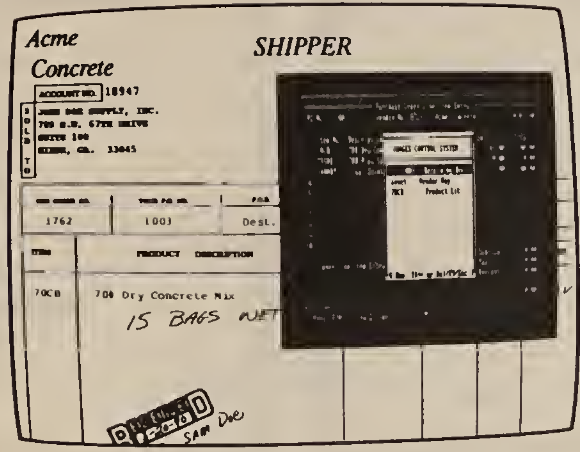
Thomas Engineering Co.
Division of Gateway Devices, Inc
2440 Stanwell Dr.
Concord, CA 94520
(800)832-8649

Call
today
for more
information!

**The Networking
Marketplace
Shannon Summers
800-622-1108 x. 596
or 508-875-6400**

SOFTWARE

Document Imaging

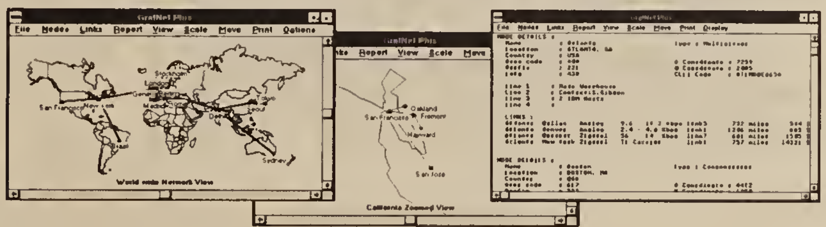


QuickView features:
High speed Scan, Display, Print & FAX
Use standalone or with your database.

Seabreeze Engineering Associates, Inc.
Orlando, Florida USA
800/277-3086 • 407/331-1996 • FAX 407/331-1589

Seabreeze Engineering

GrafNet Plus will display and document your network from Atlanta to Zurich...and more



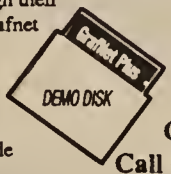
Powerful graphics and extensive reports

Grafnet Plus is a powerful presentation system for displaying networks spanning the world. The software runs under MS Windows' user friendly, menu driven interface.

You may define network nodes by entering a phone number or through their Latitude and Longitude value. Grafnet Plus will automatically plot these on geographical maps of the world and its countries. It can read and update a screen display from changes made to a text file.

Grafnet Plus also maintains comprehensive data storage capability of network parameters presented as formatted reports. The network graphs and reports may be displayed on the screen or sent to a printer.

Extensive options exist for customizing the displays and print-outs. You can select screen colors, node symbols and colors, line styles and colors. You can specify the complete page and layout format for printing the displays.



**GrafNet: $450
GrafNet Plus: $750 to $1000
Call (408) 446-9598 today for information and a free demo disk.**

**Network
Dimensions, Inc.**
5339 Prospect Rd., #122, San Jose, CA 95129

WHEN YOU CALL, TELL 'EM
YOU SAW IT IN THE
NETWORKING MARKETPLACE!

PLEXCOM'S INTELLIGENT WIRING
HUBS OFFER ......

Ethernet (10BaseT), Token Ring, AS400, IBM 3270, X.25, Terminal Servers, Bridges, Routers,
FDDI, and SNMP With RMON   CALL US FOR A QUOTE TODAY (805) 522-3333

PLEXCOM

2255 Agate Court Simi Valley, CA 93065   Telephone (805) 522-3333 Fax (805) 583-4764

INSTALLATION SERVICES

Call for Cable

Save on custom assemblies or bulk cable & accessories
- Immediate Delivery
- Guaranteed Quality

ELEKTRO ASSEMBLIES INC.
522 - 6th Ave. NW, Rochester, MN 55901
(800) 533-1558
FAX (507) 288-9655

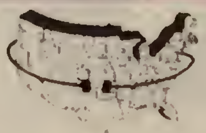
NATIONWIDE COMPUTER CABLING SERVICES

Exclusive Support For The OEM, VAR, System Integrator and Multiple Site End User Markets

- Fiber Optics, UTP, STP, Coax
- Over 130 service locations nationwide
- Multiple cable medium integration specialists
- Local installation support with nationwide coverage
- Non-competitive/complementary service to OEMs/VARs/SIs

Call 1-800-LAN-SERV For More Details

PREMISES ONE LAN SERV



• FDDI • Ethernet • Token Ring • ARCNet •

Exclusive Lifetime Warranty

COMPUTER CABLING DESIGN AND INSTALLATION

WE SPECIALIZE IN:
- Local area Network Wiring Topologies.
- Multiple site installations through our unique National Affiliate Network (NAN) program.

COST EFFECTIVE NETWORKS

• *Fiber Optics* • Token Ring • Ethernet • UTP

CERTIFIED INSTALLERS FOR:

• IBM's COS • DEC • MOD-TAP • STAR-TEK

OVER 500 INSTALLATIONS IN OVER 40 STATES!

Call For Our Nationwide Services
800-283-2821

BICSI

DATA CONNECTION

NETWORKING CAREERS

"Mediocrity Bugs Me"

Nothing is done halfway here at Network General, where you have the freedom to create projects in an environment known for support and teamwork.

LAN PROFESSIONALS

Network General, maker of the SNIFFER® family of network analyzers, is ready to talk if you have 3+ years' experience in the following environments: **Networking Protocol** - TCP/IP, Novell NetWare®, IBM SNA, OS/2 LAN Manager, ISO Sun NFS, Banyan VINES, DECnet, AppleTalk®, XNS/MS-NET, X.25, QLLC, Q.931, SS7; **Development Environments** - MS-DOS/C on PCs, Sun/UNIX®/C/MOTIF; **Networks** - Ethernet®, Token Ring®.

Opportunities are available in the following areas:

- Software Engineering
- Software QA
- Technical Training
- FoxPro/DBase Programming
- Technical Support
- Technical Publications
- Product Marketing

Visit our Employment Hospitality Suite
ANA Hotel San Francisco
50 3rd Street, San Francisco, CA.
(one block from the Moscone Center)
July 22, 9 AM - 5 PM

We also have openings for Sales Representatives, Major Account Sales Representatives and Systems Engineers throughout the country (Anaheim, Atlanta, Charlotte, Chicago, Dallas, San Jose, Connecticut, New York/New Jersey, Washington, D.C.).

We've worked the bugs out.

We offer one of the best compensation packages in our business, plus comprehensive benefits. Please send your resume to Network General, Professional Staffing, Dept. NW, 4200 Bohannon Drive, Menlo Park, CA 94025, or FAX it to: (415) 321-0855, Dept. NW. We support workforce diversity. EOE/AA/ADA.

Trademarks are registered to their respective companies.

Network General

We solve network problems.™

ResDirect

▶ *ResDirect* is a new on-line faxing service that allows you, the *Network World* reader to fax your resume and cover letter to any participating *Network World* recruitment advertiser directly from your personal computer. ▶ You can utilize *ResDirect* to make contact with as many advertisers as you like with the speed and privacy of never leaving your desk! ▶ *ResDirect* is free of charge to *Network World* readers. ▶ Simply log onto *Networking Careers On-Line* **508/620-1160 [300-2400 Baud], 508/620-1178 [up to 9600 Baud]** for full instructions and access to ***ResDirect.***

Recruit the Best !

Network World is the #1 source for recruiting highly qualified networking and communications professionals. With over 150,000 direct subscribers, our readers turn to **Network World** every week to stay current. From ISDN to X.25, SNA to TCP/IP ... **Network World** readers have the technical skills and management experience you are looking for.

So when you need to hire qualified networking and communications professionals, recruit in **Network World** ... where the best and brightest turn to stay that way.

To learn more about recruiting in **Network World** and about our current special advertising opportunities, call Bill Reinstein at 800-622-1108 (in MA 508-875-6400) today !

NETWORKING CAREERS

NETWORK ENGINEER

SEATTLE

NorthWestNet, an NSF-sponsored regional network, seeks an experienced engineer with a working knowledge of TCP/IP routing and topology design. For a full PD, send SASE to Engineer Search, NorthWestNet, 15400 SE 30th Place, Suite 202, Bellevue, WA 98007, or ftp from ftphost.nwnet.net:nic/nwnet/misc/net.eng.pd. Review of applications will begin Aug. 1, 1992.

NETWORKING CAREERS BONUS DISTRIBUTION

AUGUST 3rd ISSUE
AD CLOSE JULY 22nd

GROUPWARE'92

SAN JOSE
AUGUST 4th - 6th

To advertise call PAM VALENTINAS at 1•800•622•1108 today!

NETWORK WORLD
The Newsweekly of Enterprise Network Strategies

ENGINEERS

As one of the world's largest data networking companies and a leader in quality management and development, BT North America has the ability to link up cities in countries all over the globe. We are currently seeking talented, individuals for our San Jose office.

Senior Software Engineer

Design, implement, test and maintain diagnostics and networking software/firmware for tymnet hardware products. Position will interact with our manufacturing and design group to develop enhanced diagnostics. We require a BSCS with 5+ years of diagnostics and/or data communications experience. Your experience should include "C" & Assembler development in a UNIX and MS-DOS environment. (code 92-114)

Software Engineer

Transaction Processing

Qualifications require 2-4 years experience with the "C" language to work on the Online Transaction Processing System (OLTP). Data General, OLTP, System Management, and POS experience desirable. (code 92-138)

Software "QA" Engineer

Qualifications require 2-4 years experience with software "QA" Testing, Coding, Documentation and Debugging. You must have good oral communication skills. A Degree and Programming skills are preferred. (code 92-139)

We offer a competitive salary and benefits package. Qualified applicants may send a resume to: **BT North America, Human Resources, Dept. ENG-001** (indicating position code), **P.O. Box 49019, San Jose, CA 95161-9019.** We are an equal opportunity employer.

BT

BT North America

NETWORK WORLD READERS HAVE THE SKILLS YOU NEED...

According to our recent Audience Career-Skills Survey, *Network World* readers are the most experienced professionals with today's hottest technologies...

TECHNOLOGY	TOTAL # OF *NETWORK WORLD* READERS REPORTING THIS SKILL
Token-Ring	161,147
FDDI	78,592
Novell Netware	158,175
Unix	118,549
C & C++	113,596
TCP/IP	145,627
X.25	132,088
ISDN	83,876
Frame Relay	43,919

...And, they use *Network World* more than any other single source to stay current on new career opportunities. For more information on placing your recruitment ad in *Network World's Networking Careers* section, call Pam Valentinas, Senior Account Manager at (800) 622-1108.

NETWORK WORLD
The Newsweekly of Enterprise Network Strategies

Here is a professional challenge ... to expand your career while playing a pivotal role in a highly successful, customer-driven company. Netrix Corporation offers data communications products and support to help companies and government agencies maximize their private network's performance while minimizing cost. Our success has created the following career opportunities at our corporate headquarters in the Washington, DC suburbs.

Professionals

Connect with success at Netrix

Manager, Technical Assistance Center
Direct a highly qualified team in worldwide second and third level technical support using sophisticated software remote diagnostic tools. Requires 10 years experience in international communications support, including X.25, SNA, voice switching, and LAN protocols. Experience working in a vendor environment a plus.

Technical Assistance Engineer
Provide remote diagnostic support worldwide using a sophisticated network management system. Knowledge of X.25, frame relay, SNA, voice switching technologies and 5 years experience in customer support activities required.

Engineering Support
Provide in-house support for escalated software problems. Must be proficient in C and UNIX, have 10 years of experience in customer support or software development, and possess the ability to discuss highly technical matters with a diverse customer base.

Customer Support Test Engineer
Provide in-house testing of all software and hardware releases and recreate customer problems in the lab environment. Must have 5 years experience with the full range of voice and data communications testing equipment including protocol analyzers. Working knowledge of C a plus.

Software Developers (junior to senior level)
Develop quality software for Netrix products, including our NMS and integrated circuit/packet switching system. Qualifications include a B.S. degree in C.S. or E.E. (preferred) and relevant experience with C, data communications, X.25, frame relay, and ISDN.

Computer Scientist
Assist with developing the Simple Network Management Protocol (SNMP) for the Netrix NMS and develop a customized management information base for a new product line. Requires a related B.S. degree and 7-10 years software development experience using C and UNIX in a WAN environment.

Software Engineer
Create enhancements and provide technical or programming support for the Netrix NOA-based Series 100 PAD. Requires a related B.S. degree and 5 years software development experience using C and UNIX, bisync, and SNA.

If you enjoy the challenges – and rewards – of working on a success-oriented team, connect with a winning organization. Send your resume, including salary history, in confidence to:

Netrix Corporation • 13595 Dulles Technology Dr.
Herndon, VA 22071 • Attn: J. Neff • Dept. NW 720 EOE

Changing the Future of Wide Area Networking

Network World Advertising Sales Offices

BOSTON
Donna Pomponi, District Manager
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 651-1853

NEW YORK/N. NEW JERSEY
Joan Daly, Eastern Regional Manager
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(201) 587-0090/FAX: (201) 712-9786

S. NEW JERSEY/PHILADELPHIA/D.C.
Jacqueline Mita, District Manager
Patricia DiBiase, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(215) 834-1390/FAX: (201) 712-9786

CHICAGO
Dan Gentile, District Manager
Kathy Mazzie, Sales Assistant
10400 West Higgins Rd., Suite 300
Rosemont, IL 60018
(708) 297-8855/FAX: (708) 827-9159

SAN FRANCISCO
Chris Curry, Western Regional Manager
Sandra Kupiec, District Manager
Lonnie Forbes, Sales Assistant
Beverly Davis, Sales Assistant
2083 Landings Drive, Mountain View, CA 94043
(415) 691-0510/FAX: (415) 691-0525

ATLANTA
Don Seay, District Manager
Terry Sanders-Prentice, Sales Assistant
1400 Lake Hearn Dr., Suite 330, Atlanta, GA 30319
(404) 394-7509/FAX: (404) 255-5123

LOS ANGELES
Richard Carlisle, District Manager
Karen Silverstein, Sales Assistant
18008 Sky Park Cir., Suite 145, Irvine, CA 92714
(714) 250-3006/FAX: (714) 250-4881

RESPONSE CARD DECKS/ACTIONCENTER/ NETWORKING MARKETPLACE
Joan Bayon Pinsky, Sales Director/Prod. Class. Adv.
Clare O'Brien, Acct Mgr, ActionCenter Response Cards
Shannon Summers, Account Executive, Marketplace
Eleni Brisbois, Sales Assistant
(508) 875-6400/FAX: (508) 651-1853

RECRUITMENT ADVERTISING
William Reinstein, National Sales Director
Pam Valentinas, Senior Account Manager
Christie Sears, Sales Assistant
(508) 875-6400

ADVERTISING OPERATIONS
Karen Wallace - Manager of Advertising Operations
Linda Miller - Senior Account Coordinator
Cathy McPherson - Advertising Coordinator
Barbara Hill - Classified Account Supervisor
(508) 875-6400

NETWORK WORLD, INC. - An IDG Company

161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 879-3167

Colin Ungaro - President/Publisher
Thomas J. Wilson - Vice President, Sales
Debra Mahler - Adm. Assistant/Sales
Mary Fanning - Dir. of Financial Operations
Nanci Farquharson - Adm. Assistant

MARKETING
Evilee Thibeault - Vice President Marketing
Carol A. Leonard - Marketing Specialist/Events
Julianne Jeremiah - Mktg. Specialist/Promotion

RESEARCH
Ann MacKay - Research Manager

CIRCULATION
Richard Priante - Director of Circulation
Renee Visconti - Fulfillment Manager
Bobbie Cruse - Customer Service Rep.
Edna Clifford - Circulation Assistant

PRODUCTION
Ann Finn - Production Director
Cheryl Rothman - Senior Production Coordinator
Anne Rosenkranz - Imaging Manager
Terri Mitchell - Production Assistant
FAX: (508) 875-3090

REPRINTS
Donna Kirkey - Reprint Manager/Graphic Designer

LIST RENTAL SERVICES
Andrew Sambrook - List Rental Sales
P.O. Box 9151, Framingham, MA 01701-9151
(508) 879-0700

INFORMATION SERVICES
Jeff Pennett - Director of Info. Services
Jack McDonough - Manager of Info. Services

DISTRIBUTION
Bob Wescott - Distribution Manager
(508) 879-0700

IDG
Patrick J. McGovern - Board Chairman
Walter Boyd - President
William R. Murphy - Vice-President Finance
Robert Farmer - Vice Chairman

Network World is a publication of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 181 computer publications in more than 58 countries. Thirty million people read one or more IDG publications each month. Network World contributes to the IDG News Service offering the lastest on domestic and international computer news.

Vendors team in token-ring test

continued from page 1

the token ring-over-unshielded twisted-pair market, vendors said testing will convince users they can mix and match products and will spur market growth. Tests will address timing synchronization to resolve jitter concerns, as well as network distance and size issues.

The laboratory will be located at SynOptics' headquarters here. While SynOptics funded the start-up of the laboratory and will pay for the first year of operation, the facility ultimately will be run as an independent, nonprofit organization funded by member fees.

In addition to IBM and SynOptics — which last year teamed to develop a new token ring-over-unshielded twisted-pair technology — other founding members of the laboratory include Accton Technology Corp., Digital Communications Associates, Inc., Madge Networks, Inc., Olicom A/S and Texas Instruments, Inc.

The lab members will submit gear, including wiring hubs and adapter cards, to a test suite being developed in accordance with emerging IEEE 802.5 unshielded twisted-pair standards.

Because unshielded twisted pair has not been incorporated into the IEEE 802.5 standards yet, interoperability testing is a hot issue, said Michael Howard, president of Infonetics Research, Inc. in San Jose, Calif. "There is fear among users that products from different vendors won't work together," he said.

According to Stephen Thomas, vice-president of products and technology at Madge Networks, the lab is "filling an obvious gap" in the token-ring market.

Given the lack of a standard, the interoperability lab should give users confidence that different unshielded twisted-pair products will work together, he said.

The lab will enable vendors such as Madge Networks, which currently conducts interoperability tests at its own lab, to test its products with a wider variety of offerings, including those from IBM.

"Testing alongside IBM is key since IBM dominates the market," Thomas said. "The lab would lack credibility without IBM's participation."

The Open Token Foundation (OTF), a consortium of token-ring vendors that was formed in the late 1980s to promote interoperability, folded in 1990 largely because IBM never joined. The OTF also cited the resolution of the major token-ring interoperability issues of that time as a reason for its dissolution.

Since then, new interoperability issues have emerged. Not only has unshielded twisted pair become a major issue, but 16M bit/sec token-ring products have become much more prevalent.

For information on the lab, call Carol Weinreich at (408) 764-1010 or fax her at (408) 764-1299.

Bell Atlantic leads the way

continued from page 4

iff is just one of many firsts for the company. The RBHC led the drive for SMDS when it launched an SMDS field trial in October 1990 with Temple University in Philadelphia.

It followed that with a special SMDS tariff filing under which it began offering a so-called pre-SMDS service to the General Services Administration in Philadelphia. That offering, however, did not support group addressing and address screening, two key SMDS management features.

Group addressing allows an SMDS user to send a single data unit to several intended recipients. Group screening enables network managers to add and delete addresses.

With the pre-SMDS tariff, Bell Atlantic charged the GSA $500 a month and a onetime installation fee for a 1.17M bit/sec access link.

Under the general SMDS tariff, which will take effect Sept. 4, pending approval by state regulators, users will pay a flat $600 monthly charge for unlimited use of a 1.17M bit/sec SMDS access link and one address, plus $5 for each additional address. Each access line can support up to eight addresses.

Users will also pay a $1,000 onetime installation charge, a $50 fee for group addressing and $50 for each change in address screen or group address membership.

A group address can include up to 20 addresses. Any one address may be listed in as many as seven group addresses.

The one paying SMDS user, the GSA, said it is pleased with Bell Atlantic's SMDS pricing. "This SMDS pricing is attractive and is in line with what Bell Atlantic had promised us," said Bill Horst, a computer specialist with the GSA. "We're looking forward to possibly bringing on additional sites."

Analysts were also pleased. "I think $600 a month for unlimited use is very palatable," said Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy. "We think users may be willing to pay as much as $750 to $850 a month for SMDS.

DEC pads server, net software

continued from page 4

works to access an array of distributed databases, such as Oracle Corp.'s Oracle, IBM's DB2 and DEC's Rdb/VMS.

Enhancements to Accessworks include support for the SQL Access Group's (SAG) Compliant Server, which is said to expand the functionality of Accessworks products.

Accessworks also supports SAG's Call Level Interface, which allows Microsoft Corp. Windows applications that comply with Microsoft's Open Database Connectivity interface to work with Accessworks. SAG's Format and Protocol feature has been added, as well, to let DEC SQL/Services applications interoperate with other SAG-compliant servers in a network.

Accessworks also now includes Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) protocol and DEC's Deferred Query service, which automatically defers database access to a later time specified by the user. Accessworks already supports DECnet, TCP/IP, Systems Network Architecture and AppleTalk protocols.

DEC's new TCP/IP Services for OpenVMS Version 2 supports some basic TCP/IP services that were absent in the previous version, which was called VMS/Ultrix Connection.

Those services include Simple Mail Transfer Protocol electronic mail, Simple Network Management Protocol agent support, support for TCP/IP over Fiber Distributed Data Interface local-area networks and remote printing on TCP/IP networks.

OpenVMS POSIX Version 1.1 requires VMS Version 5.5 or later and is priced at $165. Server pricing ranges from $39,280 for the MicroVAX 3100 Model 90 to $460,292 for a high-end preconfigured VAX 7000.

Accessworks starts at $10,000 and is available now. TCP/IP Services for OpenVMS Version 2, also available now, is priced from $1,460 to $42,390.

3Com preps to implement ATM

continued from page 2

plan — bringing ATM to the desktop — includes development of an ATM hub backplane, workstation adapter and hub module. 3Com expects to deliver these products by the end of 1994.

According to Masri, there are two ways of looking at ATM to the desktop. One approach would be to provide a unified solution where ATM is installed everywhere, replacing all existing equipment. A second, more realistic approach, is a hybrid strategy in which current data technologies coexist with ATM.

"Customers must protect their installed investment, so they will likely keep their token rings, Ethernets and FDDI rings for data but will add — if a real-time killer application is critical — an ATM adapter at the desktop and as a module in the hub," Masri said. The hub would then be able to handle both ATM and traditional types of traffic. An example of a "killer application" is desktop videoconferencing, he said.

To address the extension of ATM to the wide area, 3Com is developing a high-capacity ATM switch and a combination hub/router based on an ATM backplane, both of which are expected by the end of 1995. 3Com realizes, however, that it cannot travel this road alone.

"We are planning to provide [ATM to the wide area] through a partnership with a global carrier because we can then ensure a high level of interoperability early on," Masri said. The company has not yet reached a partnership agreement, and Masri declined to name with which carriers 3Com is negotiating.

Kathryn Korostoff, a consultant with Strategic Networks Consulting, Inc. in Rockland, Mass., said 3Com's ATM strategy is a sound one.

"It makes sense to begin this ATM rollout with an interface for the brouter," she said. "ATM will happen first on the campus backbone, so 3Com is positioning itself well with that decision."

> "ATM will happen first on the campus backbone, so 3Com is positioning itself well."

▲▲▲

She also agreed with Masri's assessment that users can meet most performance requirements today by segmenting FDDI nets and that the real demand for ATM will not materialize until about 1996.

"Many vendors feed you the 'within 12 months' line and then have troubling meeting that deadline," Korostoff said. "3Com's time frame is a very realistic one. From both a networking and business perspective, it is a logical, rational approach."

AT&T sheds light on plan

continued from page 4

have been $500,000 or less, but there have been instances of losses of over $1 million.

Both carriers will cut the $25,000 customer liability in half if the user catches the toll fraud before the carrier. Both carriers also suspend coverage on the affected device after a toll fraud incident — AT&T stops coverage for two weeks, and Sprint has a similar provision according to a spokeswoman, but she declined to specify the period.

AT&T's Netprotect covers all 800 services except to Canada and Mexico, Virtual Terminal Network Service, international Software-Defined Network, WATS, Megacom and ProWATS. Sprint covers Ultra WATS, Virtual Private Network and Clarity calls terminating in international locations except Puerto Rico and the Virgin Islands.

AT&T requires customers to sign up for Netprotect for one year. Sprint requires customers to spend at least $30,000 per month on telephone charges and sign a two-year contract to be eligible for SprintGuard.

Both services charge a onetime activation fee. AT&T charges $120 per device up to a maximum of $12,000 per order and $300 per device for Netprotect Premium. Sprint charges $100 per device up to a maximum of $5,000.

AT&T's monthly recurring charges are set on a graduated scale depending on the number of devices and are typically higher than Sprint's prices. For example, for AT&T's regular Netprotect to cover 50 devices, users would pay $6,000 compared to $5,000 at Sprint. For 150 devices, AT&T customers would pay $12,000 compared to the $5,000 maximum from Sprint.

However, AT&T's prices become more favorable for very high-volume users. For 250 devices, AT&T customers would pay $5,750 compared to $5,000 for Sprint (see graphic, this page).

AT&T's high-end Netprotect Premium prices range from $225 per device for up to 50 devices to $100 per device for 201 or more devices. That would mean users pay $22,500 per month for 50 devices and $25,000 for 250.

Comparison of toll fraud monitoring services from AT&T and Sprint

Offering	Services covered	Onetime activation costs	Monthly recurring charges				
			0 to 50 devices	51 to 100 devices	101 to 150 devices	151 to 200 devices	Over 200 devices
AT&T Netprotect Advanced	800*, Virtual Terminal Network Service (VTNS), international SDN, WATS, Megacom, Pro WATS	$120 per location up to a maximum of $12,000 per order	$120 per CPE	$100 per CPE	$80 per CPE	$50 per CPE	$25 per CPE
AT&T Netprotect Premium	800*, VTNS, international SDN, WATS, Megacom, Pro WATS	$300 per customer premises equipment (CPE)	$225 per CPE	$200 per CPE	$175 per CPE	$150 per CPE	$100 per CPE
SprintGuard	Ultra WATS, Virtual Private Network (VPN) and Clarity calls terminating in international locations except Puerto Rico and the U.S. Virgin Islands	$100 per location up to a maximum of $5,000 (50 locations)	$100 per CPE up to a maximum of $5,000				

*Except to Canada and Mexico

User tests Wellfleet router

continued from page 1

Wellfleet has also pushed back the shipment date of the higher end 13-slot Backbone Concentrator Node — originally scheduled for availability last quarter — to the end of the year.

The initial release of the Backbone Link Node will only provide routing for the Transmission Control Protocol/Internet Protocol and Digital Equipment Corp.'s DECnet, as well as support for spanning tree bridging capabilities. It will support Ethernet, Fiber Distributed Data Interface and serial line interfaces only.

Wellfleet said users can expect the remaining suite of protocols to be available in a single software release by year end, including Apple Computer, Inc.'s AppleTalk, Novell, Inc.'s Internetwork Packet Exchange (IPX), Xerox Corp.'s Xerox Network Systems, as well as emerging Open Systems Interconnection protocols.

The software release will also contain source routing and three routing protocols, including the Routing Information Protocol, Open Shortest Path First and the OSI Integrated Intermediate System to Intermediate System protocols.

In addition, the device will support by year end a token-ring LAN interface and, on the wide-area side, X.25, T-1, frame relay and Switched Multimegabit Data Service interfaces.

Rowell said ABB is not currently interested in the Backbone Node's gigabit-speed performance since his network is mostly composed of 56K bit/sec and T-1 dedicated links to more than 100 ABB sites domestically.

"We're not a campus network running optical imaging with five FDDI interfaces in the box," he said. "That kind of high speed is targeted at select users."

The gigabit performance might be attractive to ABB sites in Europe, however, since many use fiber optic-based metropolitan-area networks.

Backbone Link Node in use

Rowell is currently using the device as a DECnet router and running that network in parallel with his existing LAN internet, giving him an alternative if the new device malfunctions.

The Backbone Link Node's online servicing and configuration management capabilities, such as hot swapability and dynamic reconfiguration, enable him to perform operational and maintenance upgrades on the router while it is in operation. Previously, Rowell would need to take his existing Wellfleet routers down in the early morning to perform such tasks. In addition, the bridge/router's hardware and software fault isolation capabilities allow him to isolate failures to a particular protocol or processor without adversely affecting the entire system.

In addition to its high availability, Rowell said he is equally interested in the bridge/router's advanced SNMP capabilities. Called Site Manager, the new application is bundled with the bridge/router and lets users at an SNMP management station monitor and control the device via SNMP's GET and SET commands.

Using the new management software, ABB can monitor its bridge/routers and issue commands to control damage and perform repairs. The SET functionality also enables Rowell to change default values and routing tables, as well as set filter and performance parameters.

Although it is still somewhat sluggish in performance, Rowell said he expects the glitches to be ironed out by the time the net management application is available for his installed base of Wellfleet bridge/routers.

IAB postpones Internet decision

continued from page 2

But members of the Internet community viewed the IAB proposal as a de facto decision and decried the IAB stance as dictatorial because other proposals had yet to be fully discussed.

"This issue is much too important and far-reaching to be handled in such an arbitrary and capricious way," said one attendee who requested anonymity. "We haven't even examined all the proposals, so how could anyone have made a decision?"

IAB member Vint Cerf, president of the Internet Society, said the recommendation was designed to encourage Internet Engineering Task Force working groups explore development of CLNP for Internet needs. For example, CLNP may have to be modified to add the multicasting functionality IP has.

But facing opposition from across the Internet community, the IAB cancelled plans to debate the CLNP proposal at last week's meeting here, instead opting to have all alternative proposals discussed at its next meeting in early November.

The alternatives include 'P' Internet Protocol (PIP) and New Internet Routing and Address Architecture, dubbed Nimrod. Older ideas, such as IP address encapsulation and address translation, will also be reviewed.

The IAB maintains that its plan to confront the Internet's address crisis was widely misunderstood, primarily because the 11-member board did a poor job of explaining its intent.

"We submitted it as a draft, assuming it would be viewed literally as a draft; it was just a working document," he said. "Our hope was that people would help us modify the plan so we could have something everyone agreed on."

Chapin added, "The IAB isn't in any sense a directorate that tells people what to do. Unfortunately, people interpreted the recommendation as the IAB playing a bunch of autocrats removed from the realities of the world saying, 'Thou shalt do X'.

"People did not feel comfortable picking just one proposal. It became clear we needed further analysis," he said. "In the next three to four months, all proposals can be fleshed out and loose ends tied up. In November, we can pick a direction and handle these pressing problems."

However, the solution will not come easily because changing something as fundamental as a lower layer protocol, such as IP, will have a significant impact on networks.

Ross Callon, a member of the technical staff at Digital Equipment Corp.'s distributed systems architecture division, noted that during the future Internet migration, all devices and applications that use routing information will have to be updated to handle new addresses. Callon, now working on a CLNP-based proposal, said a migration plan must include a way for systems that are not updated to talk to newer systems.

The transition will cost users time and money and will also have a profound impact on the vendor community.

Cerf emphasized the need to reach a decision quickly so that the next large-scale network migration can be made. He said that the last major transition occurred in 1983 when the Advanced Research Projects Agency Network swapped out the Network Control Protocol in favor of TCP/IP. At that time, there were only a hundred computers on the network and the transition was neither smooth nor flawless.

"Now there are a million computers to deal with," Cerf said. "We have to get the decision made and the specification written because we don't have much time before the problems hit hard."

NETWORK WORLD

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $5.00 a copy; U.S. — $95 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada to qualified management or professionals who specify and maintain communications equipment, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

Copyright 1991 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.

BPA

Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.
ISSN number: 0887-7661.

Your business is safe with us.
Especially when it's really taking off.
ACCOUNTS RECEIVABLE / FORECASTS
3M MAGNUS™ 1.35 DATA CARTRIDGE
1.35 Gbytes

Wherever you're growing, now you can get to over a gigabyte of capacity. Our new 3M Magnus™ 1.0 and 1.35 data cartridges are just the start to a whole new generation of increasing data cartridge speed and capacity. We're ready when you are.

That's why more business protects important information on 3M brand diskettes and data cartridges than any other brand in the world. Call 1-800-888-1889 ext.7 to find out more.

Innovation working for you™

3M Magnus 1.0 and 1.35 data cartridges require a compatible drive. ©3M 1991. Magnus is a trademark of 3M.

3M

Worldwide Sponsor 1992 Olympic Games
36USC380

Circle Reader Service #118